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# Emission Reduction on Two Industrial Boilers with Major Combustion Modifications (Data Supplement)

KVB, Inc, Tustin, CA

Prepared for

Industrial Environmental Research Lab, Research Triangle Park, NC

Dec 78

United States
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Agency

Industrial Environmental Research
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Research Triangle Park NC 2

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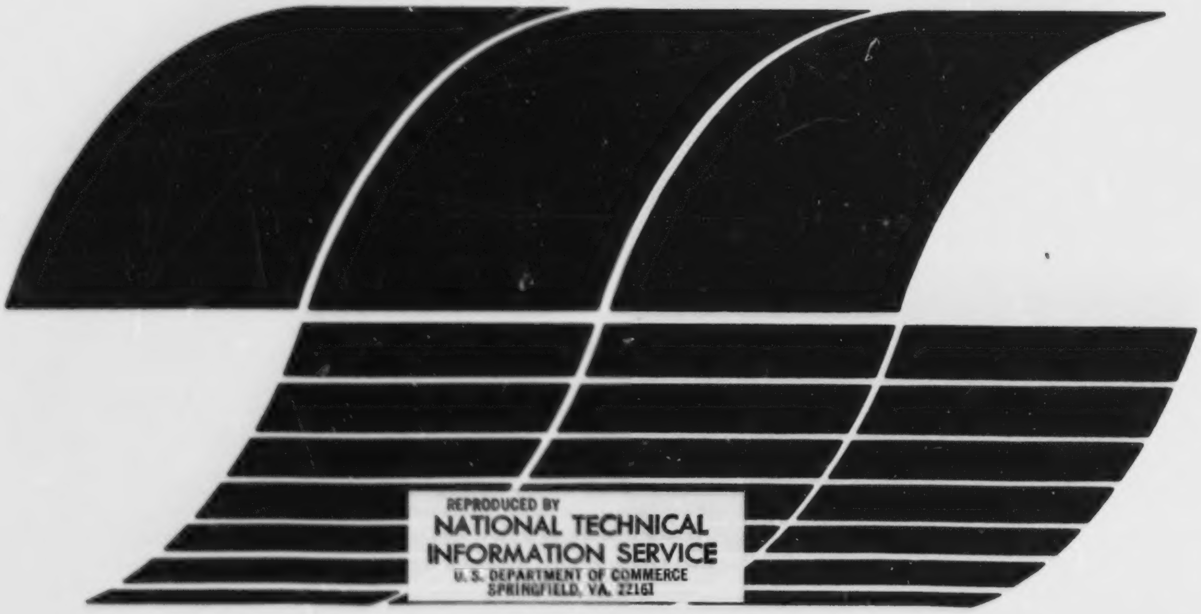
PB 291389

EPA

# Emission Reduction on Two Industrial Boilers with Major Combustion Modifications
## (Data Supplement)

## Interagency Energy/Environment R&D Program Report



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16. ABSTRACT

The report provides raw data from a study of the effects on air pollutant emissions of extensive combustion modifications on two industrial boilers. The supplement is intended for researchers who wish to perform their own detailed calculations.

17. KEY WORDS AND DOCUMENT ANALYSIS

| a. DESCRIPTORS | | b. IDENTIFIERS/OPEN ENDED TERMS | c. COSATI Field/Group | |
|---|---|---|---|---|
| Air Pollution | Particle Size | Air Pollution Control | 13B | 14B |
| Combustion | Flue Gases | Stationary Sources | 21B | |
| Boilers | Circulation | Combustion Modification | 13A | |
| Burners | Fuel Oil | Industrial Boilers | | |
| Nitrogen Oxides | Natural Gas | Particulate; Excess Air | 07B | |
| Smoke | Trace Elements | Staged Combustion | | 06A |
| Fossil Fuels | Organic Compounds | Trace Species | 21D | 07C |

| | | |
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EPA-600/7-78-099b

December 1978

# Emission Reduction on Two Industrial Boilers with Major Combustion Modifications
## (Data Supplement)

by

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Contract No. 68-02-2144
Program Element No. EHE624A

EPA Project Officer: Robert E. Hall

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Office of Energy, Minerals, and Industry
Research Triangle Park, NC 27711

Prepared for

U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Research and Development
Washington, DC 20460

1a

## Limitations On Application Of Data Reported

The data cited in this report are test results of measured pollutant emissions from two industrial boilers. These emission levels are not suitable for use in estimating mean emissions from industrial boilers as a class nor are they suitable in compiling areawide emission inventories. They are not suitable for predicting emissions from any one boiler or as regulatory limits or emission standards. Use of emissions as emission standards automatically would place a large proportion of the industrial boiler population in noncompliance.

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# FOREWORD

The purpose of this Data Supplement Volume is to document data in greater detail than was practical in the final report for this contract. It is intended to provide the necessary details to other researchers who are interested in performing their own analysis.

Readers are referred to the contract final report for information as to objectives, selection of units, measurement procedures, interpretations and conclusions.[1]

All data presented for gaseous emission concentrations of NO, $NO_x$, CO, HC, $SO_2$, and $SO_3$ are expressed in parts per million by volume (ppm) on a dry basis corrected to 3 percent $O_2$ by volume (dry) in the flue gas.

The data are arranged in this volume by Location Number for Locations 19 and 38. A location is defined as one company or plant in which one or more units were tested. Each boiler tested at a location is identified by a unit number. The contract final report refers to the test number when data are discussed. The test number is of the form XX/YY-ZZ, where XX = location number, YY = unit number, and ZZ = test number on that unit. For sites where only one unit was tested the /YY unit number is deleted.

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[1] Carter, W. A., et al., "Emissions Reduction on Two Industrial Boilers with Major Combustion Modifications," PB 283 109, EPA 600/7-78-099a, June 1978.

For each unit tested, the data supplement contains the following information:

1. Industrial Boiler Design Data

   Design data tabulations include: unit description, installation date, steam conditions, furnace characteristics, burner type and spacing, fuels burned, and design temperatures for fuel, air and stack gas.

2. Mobile Laboratory Data (Gaseous Emissions)

   Emission measurements tabulated for each test include test type test load, combustion conditions (excess $O_2$, $CO_2$), gaseous emissions ($NO_x$, NO, CO, HC, $SO_x$, and $SO_2$ all at the measured $O_2$ and at 3% $O_2$, dry).

3. Unit Operating Data

   Control room data tabulated include steam pressure and temperature, combustion air and stack temperatures, fuel flow, fuel temperature and pressure, furnace pressure, and burner air register setting.

4. Fuel Analysis

   Laboratory reports of fuel analysis are included.

5. EPA Method 5 Particulates and Cascade Impactor Data

   Data sheets for EPA Method 5 include control console data, particulate calculation sheet, and particulate emission calculations. Data sheets for cascade impactors include control console data, cascade impactor weight data, calculated aerodynamic particle size for each stage, and particulate emission calculations.

   The impactor used was an Anderson 2000 Model III with the following stage dimensions:

| Jet No. | Jet Diameter, cm |
|---|---|
| 1 | 0.1638 |
| 2 | 0.1253 |
| 3 | 0.0948 |
| 4 | 0.0759 |
| 5 | 0.0567 |
| 6 | 0.0359 |
| 7 | 0.0261 |
| 8 | 0.0251 |

6. Plume Opacity Observation Record

   Opacity observations by EPA Method 9 are recorded.

7. Velocity Traverse Data

   Stack traverse data for $O_2$, velocity and temperature as a function of position in the stack are included.

8. $SO_x$ Data Sheets

   $SO_x$ calculation data for each of three runs with the wet chemistry train are included.

9. SASS Test Data (Location 19 only)

   Data sheets include sampling conditions, control console data, particulate emission calculations, sample recovery logs, and sample concentration results by atomic absorption, spark source mass spectrometry, gas chromatography, and gas chromatograph-mass spectrograph.

Dash marks entered on the data forms indicate that data were not available.

## INSTRUMENTATION

The emission measurements were made with instrumentation contained in a 2.5 by 9 meter (8 by 30 ft) laboratory trailer. The gaseous emission measurements were made with analyzers located in the measurement console in the trailer. The particulate concentration, particulate size, sulfur oxides, and trace species concentration measurements were made with instrumentation prepared in the wet chemistry area of the laboratory and taken to the sample port. The weighing and titration were done in or near the laboratory.

The emission measurement instrumentation used for the program was that shown in Table 1. The operation of the instrumentation is discussed in detail in the contract final report.

TABLE 1. EMISSION MEASUREMENT INSTRUMENTATION

| Emission | Symbol | Measurement Method | Equipment Mfgr & Model |
|---|---|---|---|
| Nitric oxide | NO | Chemiluminescent* | Thermo Electron, 10A |
| Oxides of nitrogen | $NO_x$ | Chemiluminescent* | Thermo Electron, 10A |
| Carbon monoxide | CO | Spectrometer* | Beckman, 864 |
| Carbon dioxide | $CO_2$ | Spectrometer* | Beckman, 865 |
| Oxygen | $O_2$ | Polarographic* | Teledyne, 326A |
| Hydrocarbons | HC | Flame ionization* | Beckman, 402 |
| Sulfur dioxide | $SO_2$ | Photometric* | Dupont, 400 |
| Sulfur dioxide and trioxide | $SO_2$, $SO_3$ | Absorption/titration | KVB Equipment Co. |
| Total particulate matter | PM | EPA Standard Method 5 | Joy Mfg. Co. |
| Particulate size | -- | Cascade impactor | Anderson 2000, Mark III |
| Smoke spot | K | Reflection | Research Appliance Co. |
| Opacity | -- | EPA Standard Method 9 | -- |
| Trace species and organics | | EPA SASS Train | Acurex/Aerotherm SASS |

*Precision, ± 1% of Full Scale

## GLOSSARY OF SYMBOLS USED ON DATA FORMS

**Burner Type**

| | |
|---|---|
| Air | Air Atomizer |
| Ring | Natural Gas Ring |
| Spud | Natural Gas Gun |
| Steam | Steam Atomizer |

**Test Fuel**

| | |
|---|---|
| NG | Natural Gas |
| #2 | No. 2 Grade Fuel Oil |
| #6 | No. 6 Grade Fuel Oil |

**Test Type**

| | |
|---|---|
| Air Reg | Air Register Adjustment |
| Atom Press | Burner Atomizing Pressure Adjustment |
| BOOS | Burners Out Of Service |
| Base | Baseline |
| BrTune | Boiler Tuneup |
| Damper | Air Damper Adjustment |
| HiAir | High Excess Air |
| HiLoad | High Load |
| LowAir | Low Excess Air |
| LowLoad | Low Load |
| LowNOx | Low $NO_x$ Condition |
| NrmlAir | Normal Excess Air |
| OFA | Overfire Air |
| SCA | Staged Combustion Air |
| SteamInjec | Steam Injection |
| VPH | Variable Combustion Air Temperature |
| Viscosity | Fuel Oil Viscosity |
| FGR | Flue Gas Recirculation |
| SASS | Source Assessment Sampling System |

# CONVERSION FACTORS

## SI Units to Metric or English Units

| To Obtain | From | Multiply By |
|---|---|---|
| g/Mcal | ng/J | 0.004186 |
| $10^6$ Btu | GJ | 0.948 |
| Btu | gm cal | $3.9685 \times 10^{-3}$ |
| lb/$10^6$ Btu | ng/J | 0.00233 |
| ft | m | 3.281 |
| in. | cm | 0.3937 |
| $ft^2$ | $m^2$ | 10.764 |
| $ft^3$ | $m^3$ | 35.314 |
| lb | kg | 2.205 |
| Fahrenheit | Celsius | $t_F = 9/5(t_c) + 32$ |
| Fahrenheit | Kelvin | $t_F = 1.8t_K - 460$ |
| psig | Pa | $P_{psig} = (P_{pa})(1.450 \times 10^{-4}) - 14.7$ |
| psia | Pa | $P_{psia} = (P_{pa})(1.450 \times 10^{-4})$ |
| iwg (39.2 °F) | Pa | $P_{iwg} = (P_{pa})(4.014 \times 10^{-3})$ |
| $10^6$ Btu/hr | MW | 3.413 |
| GJ/hr | MW | 3.60 |

| To Obtain ppm at 3% $O_2$ of | Multiply* Concentration in ng/J by |
|---|---|
| Natural Gas Fuel | |
| CO | 3.23 |
| HC | 5.65 |
| NO or $NO_x$ | 1.96 |
| $SO_2$ or $SO_x$ | 1.41 |
| Oil Fuel | |
| CO | 2.93 |
| HC | 5.13 |
| NO or $NO_x$ | 1.78 |
| $SO_2$ or $SO_x$ | 1.28 |
| Coal Fuel | |
| CO | 2.69 |
| HC | 4.69 |
| NO or $NO_x$ | 1.64 |
| $SO_2$ or $SO_x$ | 1.18 |

*These conversions depend on fuel composition. The values given are for typical fuels.

## English and Metric Units to SI Units

| To Obtain | From | Multiply By |
|---|---|---|
| ng/J | lb/$10^6$ Btu | 430 |
| ng/J | g/Mcal | 239 |
| GJ | $10^6$ Btu | 1.055 |
| m | ft | 0.3048 |
| cm | in. | 2.54 |
| $m^2$ | $ft^2$ | 0.0929 |
| $m^3$ | $ft^3$ | 0.02832 |
| kg | lb | 0.4536 |
| Celsius | Fahrenheit | $t_c = 5/9\ (t_F - 32)$ |
| Kelvin | Fahrenheit | $t_K = 5/9\ (t_F - 32) + 273$ |
| Pa | psig | $P_{pa} = (P_{psig} + 14.7)(6.895 x 10^3)$ |
| Pa | psia | $P_{pa} = (P_{psia})(6.895 x 10^3)$ |
| Pa | iwg (39.2 °F) | $P_{pa} = (P_{iwg})(249.1)$ |
| MW | $10^6$ Btu/hr | 0.293 |
| MW | GJ/hr | 0.278 |

| To Obtain ng/J of | Multiply* Concentration in ppm @ 3% $O_2$ by |
|---|---|
| Natural Gas Fuel | |
| CO | 0.310 |
| HC | 0.177 |
| NO or $NO_x$ (as $NO_2$) | 0.510 |
| $SO_2$ or $SO_x$ | 0.709 |
| Oil Fuel | |
| CO | 0.341 |
| HC | 0.195 |
| NO or $NO_x$ (as $NO_2$) | 0.561 |
| $SO_2$ or $SO_x$ | 0.780 |
| Coal Fuel | |
| CO | 0.372 |
| HC | 0.213 |
| NO or $NO_x$ (as $NO_2$) | 0.611 |
| $SO_2$ or $SO_x$ | 0.850 |

*These conversions depend on fuel composition. The values given are for typical fuels.

## INDUSTRIAL BOILER DESIGN DATA

Location No. 19 Unit No.

Unit Description

KEELER WATERTUBE BOILER TYPE D

MODEL WB-1-145

| | |
|---|---|
| Installation Date | 1970 |
| Steam Output (lb/hr x $10^3$) | 17.5 |
| Design Pressure, psig | 250 |
| Operating Pressure, psig | 160 |
| Final Steam Temp., °F | SATURATED |
| Feedwater Temp., °F | 220 |
| Furnace Type | WATERTUBE |
| Furnace Size L-W-H (ft) | 9-6-8 |
| Total Heating Surface, $ft^2$ | 1881 |
| Radiant Heating Surface, $ft^2$ | 288 |
| Convection Heating Surface, $ft^2$ | 1593 |
| Furnace Volume, $ft^3$ | 430 |
| Burner Description | 1 FABER GAS RING AND OIL GUN BURNER |
| Test Fuel | NAT. GAS, #2 OIL, #6 OIL |
| Primary Air Temp., °F | AMBIENT |
| Stack Temp., °F | ~490 |

Comments: BOILER WAS EQUIPPED WITH OVERFIRE AIR PORTS AND FLUE GAS RECIRCULATION DUCTING

MOBILE LABORATORY DATA

Test No.________

Test No. 19-3 Date 1/4/77 Location 19 Engr. G. SOTTER

Unit No.________ Fuel #2 Capacity 17500 lbs/hr

Unit Type D59-2 Burner Type WB 114.5 FABER

| | 19-1 | | 19-2 | | 19-3 | | 19-4 | | 19-5 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | | | | | | | | | | |
| 2. Date | 1/4/77 | | 1/4/77 | | 1/5/77 | | 1/5/77 | | 1/6/77 | |
| 3. Time | 1440 | | 1515 | | 1035 | | 1510 | | 0925 | |
| 4. Load | 14500 | | 14 500 | | 14 500 | | 14 500 | | 14 500 | |
| 5. Process Rate | — | | | | | | | | | |
| 6. Flue Diam. or Size, ft | $2\frac{1}{2}$ | | $2\frac{1}{2}$ | | $2\frac{1}{2}$ | | $2\frac{1}{2}$ | | 2.5 | |
| 7. Probe Position | CENTER | | CENTER | | CENTER | | CENTER | | CENTER | |
| 8. Oxygen (%) | 3.05 | | 2.95 | | 3.18 | | 3.15 | | 3.20 | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 95 | 95 | 93 | 93 | 92 | 93 | 88 | 81 | 105 | 106 |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 95 | 95 | 93 | 93 | 92 | 93 | 88 | 81 | 105 | 106 |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 0 | | 0 | | 0 | 0 | 0 | 0 | 0 | |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 110 | 110 | 108 | 108 | 107 | 108 | 108 | 109 | 119 | 120 |
| 13. Carbon Dioxide (%) | | | | | | | | | | |
| 14. Carbon Monoxide (ppm) uncor/cor* | 9 | | 8 | | 11 | 11 | 8 | 8 | 4 | 4 |
| 15. Hydrocarbon (ppm) uncor/cor* | 0 | | 0 | | 5 | 5 | 3 | 3 | 2 | 2 |
| 16. Sulfur Dioxide (ppm) uncor/cor* | 60 | 60 | 80 | 80 | 80 | 81 | 90 | 91 | 70 | 71 |
| 17. Smoke Spot (Bacharach) | 0 | | 0 | | 0 | | | | | |
| 18. Atmos. Temp. (°F/°C) | 36 °F | | 36 °F | | 18 °F | | 26 | | 10 °F | |
| 19. Dew Point Temp. (°F/°C) | | | | | | | | | — | |
| 20. Atmos. Pressure (in. Hg) | 30.07 | | 30.07 | | 30.16 | | 30.06 | | 30.19 | |
| 21. Relative Humidity (%) | 65% | | 65% | | 87% | | 63% | | 87 | |
| 22. % SULFUR (APPROX FROM $SO_2$) | 0.10 | | 0.14 | | 0.14 | | .156 | | 0.12 | |
| 23. | | | | | | | | | | |
| 24. | | | | | | | | | | |
| 25. | | | | | | | | | | |
| 26. | | | | | | | | | | |
| 27. | | | | | | | | | | |
| 28. | | | | | | | | | | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

## MOBILE LABORATORY DATA

Test No.________

Test No. 1 Date________ Location 19 Engr. G. SOTTER

Unit No.________ Fuel #2 Capacity 17,500 LB/HR

Unit Type DS 9-2 Burner Type FABER WB 114.5

| | 19-6 | | 19-7 | | 19-8 | | 19-9 | | 19-10 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | |
| 2. Date | 1-6-77 | | 1-6-77 | | 1-6-77 | | 1-7-77 | | 1-10-77 | |
| 3. Time | 10:30 | | 15:30 | | 1605 | | 1015 | | 0900 | |
| 4. Load | 14500 | | 14500 | | 14500 | | 14500 | | 14500 | |
| 5. Process Rate | — | | | | | | | | | |
| 6. Flue Diam. or Size, ft | 2.5 | | 2.5 | | 2.5 | | 2.5 | | 2.5 | |
| 7. Probe Position | CENTER | | CENTER | | CENTER | | CENTER | | CENTER | |
| 8. Oxygen (%) | 3.12 | | 2.95 | | 2.90 | | 3.05 | | 3 2 | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 102 | | 102 | 102 | 102 | 101 | 88 | 88 | 101 | 102 |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 102 | | 102 | 102 | 102 | 101 | 88 | 88 | 101 | 102 |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | 0 |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 117 | | 115 | 115 | 117 | 116 | 107 | 107 | 116 | 117 |
| 13. Carbon Dioxide (%) | | | | | | | | | | |
| 14. Carbon Monoxide (ppm) uncor/cor* | 1 | | 11 | 11 | 12 | 12 | 11 | 11 | 12 | 12 |
| 15. Hydrocarbon (ppm) uncor/cor* | 3 | | 5 | 5 | 7 | 7 | 5 | 5 | 5 | 5 |
| 16. Sulfur Dioxide (ppm) uncor/cor* | 85 | 85.4 | 100 | 100 | 90 | 89 | 80 | 80 | 80 | 81 |
| 17. Smoke Spot (Bacharach) | 0 | | | | | | 0 | | 0 | |
| 18. Atmos. Temp. (°F/°C) | 14 | | 25°F | | 25°F | | 26 | | 34°F | |
| 19. Dew Point Temp. (°F/°C) | | | | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | 30.19 | | 30.10 | | 30.06 | | 29.60 | | 29.28 | |
| 21. Relative Humidity (%) | 87 | | | | | | 90 | | | |
| 22. % S IN FUEL | 0.15 | | .172 | | .153 | | .138 | | .139 | |
| 23. | | | | | | | | | | |
| 24. | | | | | | | | | | |
| 25. | | | | | | | | | | |
| 26. | | | | | | | | | | |
| 27. | | | | | | | | | | |
| 28. | | | | | | | | | | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No. 2 + 4 Date 1-10-77 Location 19 Engr. BRIENZA

Unit No.________ Fuel________ Capacity________

Unit Type DS 9-2 Burner Type FABER WB 114.5

| | 19-11 | | 19-12 | | 19-13 | | 19-14 | | 19-15 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | | | | | | | | | | |
| 2. Date | 1-10-77 | | 1-10-77 | | 1-10-77 | | 1-10-77 | | 1-11-77 | |
| 3. Time | 0950 | | 1040 | | 1100 | | 1138 | | 0938 | |
| 4. Load | 14500 | | 14500 | | 14500 | | 14500 | | 14500 | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | 2.5 | | 2.5 | | 2.5 | | 2.5 | | 2.5 | |
| 7. Probe Position | CENTER | | CENTER | | CENTER | | CENTER | | CENTER | |
| 8. Oxygen (%) | 5.15 | | 0.92 | | 0.59 | | 3.00 | | 3.00 | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 88 | 100 | 88 | 79 | 88 | 78 | 33 | 33 | 91 | 91 |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 88 | 100 | 88 | 79 | 88 | 78 | 33 | 33 | 91 | 91 |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 0 | 0 | 0 | | 0 | | 0 | 0 | 0 | 0 |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 102 | 116 | 106 | 95 | 107 | 94 | 38 | 38 | 105 | 105 |
| 13. Carbon Dioxide (%) | — | | | | | | | | | |
| 14. Carbon Monoxide (ppm) uncor/cor* | 8 | 9 | 72-84 | 65-75 | 400-580 | 352-510 | 8 | 8 | 8 | 8 |
| 15. Hydrocarbon (ppm) uncor/cor* | 5 | 5.6 | 8 | 7.2 | 12 | 10.5 | 10 | 10 | 5 | 5 |
| 16. Sulfur Dioxide (ppm) uncor/cor* | 70 | 79 | 90 | 81 | 90 | 79 | 80 | 80 | 75 | 75 |
| 17. Smoke Spot (Bacharach) | 0 | | 4 | | 5 | | 0 | | 0 | |
| 18. Atmos. Temp. (°F/°C) | 34°F | | 33°F | | 33°F | | 33°F | | 14°F | |
| 19. Dew Point Temp. (°F/°C) | | | | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | 29.28 | | 29.25 | | 29.24 | | 29.24 | | 30.04 | |
| 21. Relative Humidity (%) | ~100% RAINING | | ~100% SNOW | | ~100% SNOW | | SNOW | | 53% | |
| 22. % S IN FUEL | .136 | | .139 | | .136 | | .137 | | .129 | |
| 23. | | | | | | | | | | |
| 24. | | | | | | | | | | |
| 25. | | | | | | | | | | |
| 26. | | | | | | | | | | |
| 27. | | | | | | | | | | |
| 28. | | | | | | | | | | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.

Test No. 4 Date 1-11-77 Location 19 Engr. BRIENZA

Unit No. Fuel #2 Capacity 17,500

Unit Type DS 9-2 Burner Type FABER WB 114.5

| | 19-16 | | 19-17 | | 19-18 | | 19-19 | | 19-20 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | |
| 2. Date | 1-11-77 | | 1-11-77 | | 1-11-77 | | 1-11-77 | | 1-11-77 | |
| 3. Time | 1030 | | 1055 | | 1205 | | 1225 | | 1250 | |
| 4. Load | 14500 | | 14500 | | 14500 | | 14500 | | 14500 | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | 2.5 | | 2.5 | | 2.5 | | 2.5 | | 2.5 | |
| 7. Probe Position | CENTER | | CENTER | | CENTER | | CENTER | | CENTER | |
| 8. Oxygen (%) | 3.00 | | 2.85 | | 2.90 | | 0.70 | | 1.05 | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 43 | 43 | 32 | 32 | 36 | 36 | 32 | 28 | 38 | 34 |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 43 | 43 | 32 | 32 | 36 | 36 | 32 | 28 | 38 | 34 |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 50 | 50 | 43 | 43 | 42 | 42 | 37 | 33 | 45 | 40 |
| 13. Carbon Dioxide (%) | — | | | | | | | | | |
| 14. Carbon Monoxide (ppm) uncor/cor* | 8 | 8 | 10 | 10 | 10 | 10 | 350 | 310 | 62 | 56 |
| 15. Hydrocarbon (ppm) uncor/cor* | 3 | 3 | 5 | 5 | 7 | 7 | 7 | 6.2 | 5 | 4.5 |
| 16. Sulfur Dioxide (ppm) uncor/cor* | 70 | 70 | 80 | 79 | 70 | 70 | 80 | 71 | 85 | 77 |
| 17. Smoke Spot (Bacharach) | 0 | | 0 | | 0 | | 1 | | 1 | |
| 18. Atmos. Temp. (°F/°C) | 14°F | | 15° | | 15° | | 17 | | 17 | |
| 19. Dew Point Temp. (°F/°C) | | | | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | 30.08 | | 30.10 | | 30.10 | | 30.11 | | 30.11 | |
| 21. Relative Humidity (%) | 53 | | 53 | | 51 | | 51 | | 51 | |
| 22. %S IN FUEL | .121 | | .136 | | .121 | | .122 | | .132 | |
| 23. | | | | | | | | | | |
| 24. | | | | | | | | | | |
| 25. | | | | | | | | | | |
| 26. | | | | | | | | | | |
| 27. | | | | | | | | | | |
| 28. | | | | | | | | | | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.__________

Test No.__________ Date 1/[illegible] Location [illegible] Engr. BRIENZA

Unit No.__________ Fuel #2 Capacity [illegible]

Unit Type [illegible] Burner Type FABER WB 114.5

| | 19-21 | | 19-22 | | 19-23 | | 19-24 | | 19-25 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | [illegible] | | [illegible] | | | | | | | |
| 2. Date | 1/11/77 | | 1/12/77 | | 1/12/77 | | 1/12/77 | | 1/12/77 | |
| 3. Time | 1330 | | 0750 | | 0845 | | 0905 | | 0920 | |
| 4. Load | 14500 | | 14500 | | 14500 | | 14500 | | 14500 | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | 2.5 | | 2.5 | | 2.5 | | 2.5 | | 2.5 | |
| 7. Probe Position | CENTER | | CENTER | | CENTER | | CENTER | | CENTER | |
| 8. Oxygen (%) | .90 | | 3.00 | | 5.7 | | 5.4 | | 4.8 | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 27 | 24 | 90 | 90 | 75 | 88 | 80 | 92 | 96 | 106 |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 27 | 24 | 90 | 90 | 75 | 80 | 80 | 92 | 96 | 106 |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 32 | 28 | 103 | 103 | 88 | 103 | 92 | 106 | 111 | 123 |
| 13. Carbon Dioxide (%) | | | | | | | | | | |
| 14. Carbon Monoxide (ppm) uncor/cor* | 45 | 40 | | | | | | | | |
| 15. Hydrocarbon (ppm) uncor/cor* | 5 | 5 | 5 | 5 | 5 | 5.8 | 3 | 3 | 5 | 5 |
| 16. Sulfur Dioxide (ppm) uncor/cor* | 90 | 80 | 75 | 75 | 50 | 58 | 60 | 69 | 65 | 72 |
| 17. Smoke Spot (Bacharach) | 0 | | 0 | | 0.5 | | 0 | | 0 | |
| 18. Atmos. Temp. (°F/°C) | 19 | | 0 | | 0 | | 0 | | 0 | |
| 19. Dew Point Temp. (°F/°C) | | | | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | 30.15 | | 30.25 | | 30.26 | | 30.26 | | 30.26 | |
| 21. Relative Humidity (%) | 45 | | 75 | | 75 | | 75 | | 75 | |
| 22. % S IN FUEL | .138 | | .129 | | .101 | | .119 | | .124 | |
| 23. | | | | | | | | | | |
| 24. | | | | | | | | | | |
| 25. | | | | | | | | | | |
| 26. | | | | | | | | | | |
| 27. | | | | | | | | | | |
| 28. | | | | | | | | | | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.

Test No. Date [illegible] Location [illegible] Engr. BRIENZA

Unit No. Fuel [illegible] Capacity [illegible]

Unit Type [illegible] Burner Type WB 114.5 FABER

| | 19 26 | | 19 27 | | 19 28 | | 19 29 | | 19 30 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | |
| 2. Date | 1 12 77 | | 1 12 77 | | 1 12 77 | | 1 12 77 | | 1 12 77 | |
| 3. Time | 0940 | | 0950 | | 1230 | | 1245 | | 1300 | |
| 4. Load | 14500 | | 14500 | | 14500 | | 14500 | | 14500 | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | 2.5 | | 2.5 | | 2.5 | | 2.5 | | 2.5 | |
| 7. Probe Position | CENTER | | CENTER | | CENTER | | CENTER | | CENTER | |
| 8. Oxygen (%) | 6.3 | | 6.1 | | 3.00 | | 3.00 | | 3.03 | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 71 | 87 | | | 75 | 75 | 73 | 73 | 72 | 72 |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 71 | 87 | | | 75 | 75 | 73 | 73 | 72 | 72 |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 0 | | | | 0 | | 0 | | 0 | |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 88 | 107 | 82 | 99 | 88 | 88 | 88 | 88 | 87 | 87 |
| 13. Carbon Dioxide (%) | | | | | | | | | | |
| 14. Carbon Monoxide (ppm) uncor/cor* | | | | | 10 | 10 | 10 | 10 | 10 | 10 |
| 15. Hydrocarbon (ppm) uncor/cor* | 5 | 6 | 5 | | 1 | 1 | 3 | 3 | 3 | 3 |
| 16. Sulfur Dioxide (ppm) uncor/cor* | 60 | 73 | 60 | | 70 | 70 | 70 | 70 | 70 | 70 |
| 17. Smoke Spot (Bacharach) | — | | | | 4 | | 4 | | 4 | |
| 18. Atmos. Temp. (°F/°C) | 0 | | 0 | | 10 | | 10 | | 10 | |
| 19. Dew Point Temp. (°F/°C) | | | | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | 30.27 | | 30.27 | | 30.24 | | 30.24 | | 30.24 | |
| 21. Relative Humidity (%) | 75 | | 75 | | 55 | | 55 | | 55 | |
| 22. % S IN FUEL | | | | | .121 | | .121 | | .121 | |
| 23. | | | | | | | | | | |
| 24. | | | | | | | | | | |
| 25. | | | | | | | | | | |
| 26. | | | | | | | | | | |
| 27. | | | | | | | | | | |
| 28. | | | | | | | | | | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

## MOBILE LABORATORY DATA

Test No.

Test No. Date 1/12/77 Location 19 Engr. BRIENZA

Unit No. Fuel #2 Capacity 17500

Unit Type D59-2 Burner Type WB 114.5 FABER

| | 19-31 | | 19-32 | | 19-33 | | 19-34 | | 19-35 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | |
| 2. Date | 1/12/77 | | 1/12/77 | | 1/12/77 | | 1/12/77 | | 1/12/77 | |
| 3. Time | 1315 | | 1340 | | 1350 | | 1405 | | 1425 | |
| 4. Load | 14500 | | 14500 | | 14500 | | 14500 | | 14500 | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | 2.5 | | 2.5 | | 2.5 | | 2.5 | | 2.5 | |
| 7. Probe Position | CENTER | | CENTER | | CENTER | | CENTER | | CENTER | |
| 8. Oxygen (%) | 3.00 | | 3.04 | | 3.00 | | 3.10 | | 3.12 | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 74 | 74 | 62 | 62 | 63 | 63 | 63 | 63 | 63 | 63 |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 74 | 74 | 62 | 62 | 63 | 63 | 63 | 63 | 63 | 63 |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 87 | 87 | 72 | 72 | 74 | 74 | 74 | 74 | 75 | 75 |
| 13. Carbon Dioxide (%) | | | | | | | | | | |
| 14. Carbon Monoxide (ppm) uncor/cor* | 15 | 15 | 80 | 80 | 53 | 53 | 40 | 40 | 12 | 12 |
| 15. Hydrocarbon (ppm) uncor/cor* | 3 | 3 | 3 | 3 | 5 | 5 | 5 | 5 | 5 | 5 |
| 16. Sulfur Dioxide (ppm) uncor/cor* | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 |
| 17. Smoke Spot (Bacharach) | 5 | | 6.5 | | 5.5 | | 5.0 | | 4 | |
| 18. Atmos. Temp. (°F/°C) | 12 | | 13 | | 13 | | 13 | | 13 | |
| 19. Dew Point Temp. (°F/°C) | | | | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | 30.24 | | 30.24 | | 30.24 | | 30.24 | | 30.24 | |
| 21. Relative Humidity (%) | 45 | | 45 | | 45 | | 45 | | 45 | |
| 22. | | | | | | | | | | |
| 23. | | | | | | | | | | |
| 24. | | | | | | | | | | |
| 25. | | | | | | | | | | |
| 26. | | | | | | | | | | |
| 27. | | | | | | | | | | |
| 28. | | | | | | | | | | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA Test No.________

Test No.________ Date________ Location 19 Engr. BRIENZA

Unit No.________ Fuel #2 Capacity 17500

Unit Type DS9-2 Burner Type WB 114.5 FABER

| | 19-36 | | 19-37 | | | | 19-38 | | 19-39 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | | | | | — | | | | | |
| 2. Date | 1/12/77 | | 1/12/77 | | | | 1/13/77 | | 1/13/77 | |
| 3. Time | 1445 | | 1500 | | | | 850 | | 1115 | |
| 4. Load | 14500 | | 14500 | | | | 14500 | | | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | 2.5 | | 2.5 | | | | 2.5 | | 2.5 | |
| 7. Probe Position | CENTER | | CENTER | | | | CENTER | | CENTER | |
| 8. Oxygen (%) | 1.8 | | 1.8 | | | | 3.00 | | 3.25 | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 83 | 78 | 83 | 78 | | | 100 | | | |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 83 | 78 | 83 | 78 | | | 100 | | | |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 0 | 0 | 0 | 0 | | | 0 | | | |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 98 | 91 | 97 | 91 | | | 117 | | | |
| 13. Carbon Dioxide (%) | | | | | | | | | | |
| 14. Carbon Monoxide (ppm) uncor/cor* | 44 | 41 | 52 | 48 | | | | | | |
| 15. Hydrocarbon (ppm) uncor/cor* | 5 | 5 | 5 | 5 | | | 5 | | 5 | |
| 16. Sulfur Dioxide (ppm) uncor/cor* | 60 | 56 | 60 | 56 | | | 60 | | 240 | |
| 17. Smoke Spot (Bacharach) | 4.5 | | 4.5 | | | | 0 | | 2 | |
| 18. Atmos. Temp. (°F/°C) | 13 | | 14 | | | | -4 | | 5°F | |
| 19. Dew Point Temp. (°F/°C) | | | | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | 30.24 | | 30.24 | | | | 30.60 | | 30.57 | |
| 21. Relative Humidity (%) | 45 | | 45 | | | | | | | |
| 22. | | | | | | | | | | |
| 23. | | | | | | | | | | |
| 24. | | | | | | | | | | |
| 25. | | | | | | | | | | |
| 26. | | | | | | | | | | |
| 27. | | | | | | | | | | |
| 28. | | | | | | | | | | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

**MOBILE LABORATORY DATA** Test No.________

**Test No.**__________ **Date**__________ **Location** 19 **Engr.** BRIENZA

**Unit No.**__________ **Fuel** #6 **Capacity** 17500

**Unit Type** DS9-2 **Burner Type** WB 114.5 FABER

| | 19-40 | | 19-41 | | 19-42 | | 19-43 | | 19-44 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | ~~12-1~~ | | ~~12-2~~ | | ~~[illegible]~~ | | ~~[illegible]~~ | | ~~[illegible]~~ | |
| 2. Date | 1/13/77 | | 1/13/77 | | 1/13/77 | | 1/13/77 | | 1/14/77 | |
| 3. Time | 1450 | | 1530 | | 1555 | | 1620 | | 0820 | |
| 4. Load | 14500 | | 14500 | | 14500 | | 14500 | | 14500 | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | 2.5 | | 2.5 | | 2.5 | | 2.5 | | 2.5 | |
| 7. Probe Position | CENTER | | CENTER | | CENTER | | CENTER | | CENTER | |
| 8. Oxygen (%) | 3.71 | | 5.21 | | 1.33 | | .70 | | 3.21 | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 207 | 215 | 207 | 236 | 173 | 158 | 160 | 142 | 197 | 199 |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 207 | 215 | 207 | 236 | 173 | 158 | 160 | 142 | 197 | 199 |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 230 | 239 | 224 | 255 | 200 | 183 | 187 | 166 | 217 | 219 |
| 13. Carbon Dioxide (%) | | | | | | | | | | |
| 14. Carbon Monoxide (ppm) uncor/cor* | 17 | 17 | 19 | 21 | 40 | 36 | 330 | 292 | 8 | 9 |
| 15. Hydrocarbon (ppm) uncor/cor* | 4 | 14 | 5 | 5 | 5 | 5 | 5 | 5 | 2 | 2 |
| 16. Sulfur Dioxide (ppm) uncor/cor* | 300 | 312 | 270 | 308 | 350 | 320 | 380 | 336 | 330 | 334 |
| 17. Smoke Spot (Bacharach) | 1.5 | | 1.5 | | 5 | | 7 | | 2.0 | |
| 18. Atmos. Temp. (°F/°C) | 7 | | 7 | | 7 | | 7 | | 20 | |
| 19. Dew Point Temp. (°F/°C) | | | | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | 30.49 | | 30.49 | | 30.49 | | 30.49 | | 30.05 | |
| 21. Relative Humidity (%) | 53 | | 53 | | 53 | | 53 | | 62 | |
| 22. % S IN FUEL | .538 | | .530 | | .552 | | .580 | | .575 | |
| 23. | | | | | | | | | | |
| 24. | | | | | | | | | | |
| 25. | | | | | | | | | | |
| 26. | | | | | | | | | | |
| 27. | | | | | | | | | | |
| 28. | | | | | | | | | | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA Test No.________

Test No.__________ Date__________ Location 19 Engr. BRIENZA

Unit No.__________ Fuel #6 Capacity 17500

Unit Type DS 9-2 Burner Type WB 114.5 FABER

| | 19-45 | | 19-46 | | 19-47 | | 19-48 | | 19-49 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | [illegible] | | 14?-1? | | [illegible] | | [illegible] | | [illegible] | |
| 2. Date | 1/14/77 | | 1/14/77 | | 1/14/77 | | 1/14/77 | | 1/14/77 | |
| 3. Time | 0920 | | 0945 | | 1030 | | 1050 | | 1110 | |
| 4. Load | 14500 | | 14500 | | 14500 | | 14500 | | 14500 | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | 2.5 | | 2.5 | | 2.5 | | 2.5 | | 2.5 | |
| 7. Probe Position | CENTER | | CENTER | | CENTER | | CENTER | | CENTER | |
| 8. Oxygen (%) | 3.10 | | 3.08 | | 3.15 | | 3.20 | | 0.82 | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 180 | 181 | 180 | 181 | 177 | 178 | 172 | 174 | 126 | 112 |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 180 | 181 | 180 | 181 | 177 | 178 | 172 | 174 | 126 | 112 |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 205 | 206 | 205 | 206 | 200 | 201 | 193 | 195 | 148 | 132 |
| 13. Carbon Dioxide (%) | — | | | | | | | | | |
| 14. Carbon Monoxide (ppm) uncor/cor* | 16 | 16 | 12 | 12 | 12 | 12 | 12 | 12 | 280 | 178 |
| 15. Hydrocarbon (ppm) uncor/cor* | 2 | 2 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 4 |
| 16. Sulfur Dioxide (ppm) uncor/cor* | 320 | 321 | 320 | 321 | 320 | 322 | 320 | 323 | 360 | 321 |
| 17. Smoke Spot (Bacharach) | 2.0 | | 2.0 | | 2.0 | | 2.5 | | 5.5 | |
| 18. Atmos. Temp. (°F/°C) | 20 | | 20 | | 20 | | 20 | | 20 | |
| 19. Dew Point Temp. (°F/°C) | | | | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | 30.04 | | 30.04 | | 30.04 | | 30.03 | | 30.03 | |
| 21. Relative Humidity (%) | 62 | | 62 | | 62 | | 62 | | 62 | |
| 22. % S IN FUEL | .554 | | .554 | | .555 | | .557 | | .553 | |
| 23. | | | | | | | | | | |
| 24. | | | | | | | | | | |
| 25. | | | | | | | | | | |
| 26. | | | | | | | | | | |
| 27. | | | | | | | | | | |
| 28. | | | | | | | | | | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No.________ Date________ Location 19 Engr. BRIENZA

Unit No.________ Fuel #6 Capacity 17500

Unit Type DS 9-2 Burner Type WB 114.5 FABER

| | 19-50 | | 19-51 | | 19-52 | | 19-53 | | 19-54 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | |
| 2. Date | 1/14/77 | | 1/14/77 | | 1/17/77 | | 1/17/77 | | 1/17/77 | |
| 3. Time | 1140 | | 1150 | | 1125 | | 1410 | | 1515 | |
| 4. Load | 14500 | | 14500 | | 14500 | | 14500 | | 14500 | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | 2.5 | | 2.5 | | 2.5 | | 2.5 | | 2.5 | |
| 7. Probe Position | CENTER | | CENTER | | CENTER | | CENTER | | CENTER | |
| 8. Oxygen (%) | .98 | | .89 | | 4.8 | | 3.2 | | 2.79 | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 126 | 113 | 144 | 129 | 100 | 111 | 90 | 91 | 37 | 37 |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 126 | 113 | 144 | 129 | 100 | 111 | 90 | 91 | 37 | 37 |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 178 | 160 | 169 | 151 | 103 | 114 | 107 | 108 | 42 | 42 |
| 13. Carbon Dioxide (%) | | | | | | | | | | |
| 14. Carbon Monoxide (ppm) uncor/cor* | 50 | 45 | 180 | 161 | | | 10 | 10 | 15 | 15 |
| 15. Hydrocarbon (ppm) uncor/cor* | 5 | 5 | 5 | 5 | 3 | 3 | 0 | | 5 | 5 |
| 16. Sulfur Dioxide (ppm) uncor/cor* | 350 | 314 | 360 | 322 | 55 | 61 | 60 | 61 | 70 | 70 |
| 17. Smoke Spot (Bacharach) | 4.5 | | 5 | | 0 | | 0 | | 0 | |
| 18. Atmos. Temp. (°F/°C) | 20 | | 20 | | -4 | | 1 | | 1 | |
| 19. Dew Point Temp. (°F/°C) | | | | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | 30.03 | | 30.03 | | 29.84 | | 29.80 | | 29.80 | |
| 21. Relative Humidity (%) | 65 | | 65 | | 54 | | 54 | | 54 | |
| 22. % S IN FUEL | .542 | | .555 | | .105 | | .105 | | .120 | |
| 23. | | | | | | | | | | |
| 24. | | | | | | | | | | |
| 25. | | | | | | | | | | |
| 26. | | | | | | | | | | |
| 27. | | | | | | | | | | |
| 28. | | | | | | | | | | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

**MOBILE LABORATORY DATA** **Test No.**

**Test No.** **Date** **Location** 19 **Engr.** BRIENZA

**Unit No.** **Fuel** #2 **Capacity** 17500

**Unit Type** DS9-2 **Burner Type** WB 114.5 FABER

| | 19-55 | | 19-56 | | 19-57 | | 19-58 | | 19-59 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | |
| 2. Date | 1/17/77 | | 1/17/77 | | 1/17/77 | | 1/17/77 | | 1/17/77 | |
| 3. Time | 1525 | | 1535 | | 1555 | | 1610 | | 1620 | |
| 4. Load | 14500 | | 14500 | | 14500 | | 14500 | | 14500 | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | 2.5 | | 2.5 | | 2.5 | | 2.5 | | 2.5 | |
| 7. Probe Position | CENTER | | CENTER | | CENTER | | CENTER | | CENTER | |
| 8. Oxygen (%) | 2.72 | | 2.72 | | 3.39 | | 3.22 | | 3.26 | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 35 | 34 | 35 | 34 | 27 | 28 | 27 | 27 | 27 | 27 |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 35 | 34 | 35 | 34 | 27 | 28 | 27 | 27 | 27 | 27 |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 42 | 41 | 40 | 39 | 32 | 33 | 34 | 34 | 34 | 34 |
| 13. Carbon Dioxide (%) | | | | | | | | | | |
| 14. Carbon Monoxide (ppm) uncor/cor* | 25 | 25 | 20 | 20 | 10 | 10 | 10 | 10 | 12 | 12 |
| 15. Hydrocarbon (ppm) uncor/cor* | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| 16. Sulfur Dioxide (ppm) uncor/cor* | 70 | 69 | 70 | 69 | 60 | 61 | 55 | 55 | 55 | 55 |
| 17. Smoke Spot (Bacharach) | 0 | | 0 | | 0 | | 0 | | 0 | |
| 18. Atmos. Temp. (°F/°C) | 1 | | 1 | | 1 | | 1 | | 1 | |
| 19. Dew Point Temp. (°F/°C) | | | | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | 30.80 | | 30.80 | | 30.80 | | 30.80 | | 30.80 | |
| 21. Relative Humidity (%) | | | | | | | | | | |
| 22. | | | | | | | | | | |
| 23. | | | | | | | | | | |
| 24. | | | | | | | | | | |
| 25. | | | | | | | | | | |
| 26. | | | | | | | | | | |
| 27. | | | | | | | | | | |
| 28. | | | | | | | | | | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

**MOBILE LABORATORY DATA** **Test No.**________

**Test No.**__________ **Date**__________ **Location** 19 **Engr.** BRIENZA

**Unit No.**__________ **Fuel** #2 **Capacity** 17500

**Unit Type** DS9-2 **Burner Type** WB114.5 FABER

| | 19-60 | | 19-61 | | 19-62 | | 19-63 | | 19-64 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | 5J1a | | ~~5A2b~~ | | ~~5C2b~~ | | ~~5E2b~~ | | 5C2b | |
| 2. Date | 1/17/77 | | 1/18/77 | | | | | | | |
| 3. Time | 1645 | | 1025 | | 1040 | | 1105 | | 1115 | |
| 4. Load | 14500 | | 14500 | | 14500 | | 14500 | | 14500 | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | 2.5 | | 2.5 | | 2.5 | | 2.5 | | 2.5 | |
| 7. Probe Position | CENTER | | CENTER | | CENTER | | CENTER | | CENTER | |
| 8. Oxygen (%) | 2.97 | | 1.65 | | 1.65 | | 2.40 | | 2.40 | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 37 | 37 | 35 | 32 | 32 | 30 | 27 | 25 | 27 | 25 |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 37 | 37 | 35 | 32 | 32 | 30 | 27 | 25 | 27 | 25 |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 43 | 43 | 42 | 39 | 37 | 34 | 32 | 31 | 32 | 31 |
| 13. Carbon Dioxide (%) | | | | | | | | | | |
| 14. Carbon Monoxide (ppm) uncor/cor* | 20 | 20 | 340 | 316 | 500 | 465 | 100 | 98 | 100 | 98 |
| 15. Hydrocarbon (ppm) uncor/cor* | 3 | 3 | 30 | 28 | 40 | 37 | 5 | 5 | 5 | 5 |
| 16. Sulfur Dioxide (ppm) uncor/cor* | 60 | 65 | 80 | 74 | 80 | 74 | 70 | 67 | 70 | 67 |
| 17. Smoke Spot (Bacharach) | 0 | | 4 | | 5 | | 0.2 | | 0.2 | |
| 18. Atmos. Temp. (°F/°C) | 1 | | 0 | | 0 | | 0 | | 0 | |
| 19. Dew Point Temp. (°F/°C) | | | | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | 30.08 | | 29.85 | | 29.85 | | 29.85 | | 29.85 | |
| 21. Relative Humidity (%) | 51 | | 48 | | 48 | | 48 | | | |
| 22. % S IN FUEL | .112 | | .127 | | .127 | | .115 | | .115 | |
| 23. | | | | | | | | | | |
| 24. | | | | | | | | | | |
| 25. | | | | | | | | | | |
| 26. | | | | | | | | | | |
| 27. | | | | | | | | | | |
| 28. | | | | | | | | | | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No.__________ Date__________ Location 19 Engr. BRIENZA

Unit No.__________ Fuel #2 Capacity 17500

Unit Type DS9-2 Burner Type WB 114.5

| | 19-65 | | 19-66 | | 19-67 | | 19-68 | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | ~~5-2c~~ | | ~~5I2e~~ | | ~~562e~~ | | ~~[illegible]~~ | | | |
| 2. Date | 1/18/77 | | | | | | 1/18/77 | | | |
| 3. Time | 1125 | | 1115 | | 1215 | | 1225 | | | |
| 4. Load | 14500 | | 14500 | | 14500 | | 14500 | | | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | 2.5 | | 2.5 | | 2.5 | | 2.5 | | | |
| 7. Probe Position | CENTER | | CENTER | | CENTER | | CENTER | | | |
| 8. Oxygen (%) | 2.45 | | 2.45 | | 2.2 | | 2.18 | | | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 26 | 25 | 23 | 22 | 33 | 32 | 33 | 32 | | |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 26 | 25 | 23 | 22 | 33 | 32 | 33 | 32 | | |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 0 | 0 | 0 | 0 | 0 | | 0 | | | |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 30 | 29 | 26 | 25 | 37 | 36 | 38 | 37 | | |
| 13. Carbon Dioxide (%) | | | | | | | | | | |
| 14. Carbon Monoxide (ppm) uncor/cor* | 160 | 155 | 600 | 582 | 500 | 478 | 230 | 220 | | |
| 15. Hydrocarbon (ppm) uncor/cor* | 10 | 10 | 100 | 97 | 30 | 29 | 20 | 11 | | |
| 16. Sulfur Dioxide (ppm) uncor/cor* | 65 | 63 | 65 | 63 | 60 | 58 | 50 | 48 | | |
| 17. Smoke Spot (Bacharach) | 0 | | 0 | | 5.5 | | 4.2 | | | |
| 18. Atmos. Temp. (°F/°C) | 0 | | 0 | | 0 | | 0 | | | |
| 19. Dew Point Temp. (°F/°C) | | | | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | 29.85 | | 29.85 | | 29.85 | | 29.85 | | | |
| 21. Relative Humidity (%) | 48 | | 48 | | 48 | | 48 | | | |
| 22. % S IN FUEL | .108 | | .108 | | .100 | | .083 | | | |
| 23. | | | | | | | | | | |
| 24. | | | | | | | | | | |
| 25. | | | | | | | | | | |
| 26. | | | | | | | | | | |
| 27. | | | | | | | | | | |
| 28. | | | | | | | | | | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

**MOBILE LABORATORY DATA** Test No.

Test No. Date 1/18/77 Location 19 Engr. BRIENZA

Unit No. Fuel #6 Capacity 17500

Unit Type DS9-2 Burner Type WB 114.5 FABER

| | 19-69 | | 19-70 | | 19-71 | | | | 19-72 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | 11-3 | | 13A1b | | ~~13B1b~~ | | | | 13C1b | |
| 2. Date | 1/18/77 | | 1/18/77 | | 1/18/77 | | | | 1/18/77 | |
| 3. Time | 1415 | | 1545 | | 1600 | | | | 1640 | |
| 4. Load | 14500 | | 14500 | | 14500 | | | | 14500 | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | 2.5 | | 2.5 | | 2.5 | | | | 2.5 | |
| 7. Probe Position | CENTER | | CENTER | | CENTER | | | | CENTER | |
| 8. Oxygen (%) | 3.1 | | 3.22 | | 3.30 | | | | 3.28 | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 187 | 188 | 150 | 152 | 133 | 137 | | | 143 | 145 |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 187 | 188 | 150 | 152 | 133 | 137 | | | 143 | 145 |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 0 | | 0 | | 0 | 0 | | | 0 | |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 210 | 211 | 166 | 168 | 147 | 149 | | | 160 | 161 |
| 13. Carbon Dioxide (%) | | | | | | | | | | |
| 14. Carbon Monoxide (ppm) uncor/cor* | 4 | 4 | 10 | 10 | 10 | 10 | | | 20 | 20 |
| 15. Hydrocarbon (ppm) uncor/cor* | 5 | 5 | 3 | 3 | 5 | 5 | | | 5 | 5 |
| 16. Sulfur Dioxide (ppm) uncor/cor* | 340 | 341 | 330 | 334 | 330 | 335 | | | 330 | 335 |
| 17. Smoke Spot (Bacharach) | 3.5 | | 4.8 | | 5.2 | | | | 6.5 | |
| 18. Atmos. Temp. (°F/°C) | 7 | | 7 | | 7 | | | | 7 | |
| 19. Dew Point Temp. (°F/°C) | | | | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | 29.77 | | 29.76 | | 29.76 | | | | 29.76 | |
| 21. Relative Humidity (%) | 45 | | 45 | | 45 | | | | 45 | |
| 22. % S IN FUEL | .587 | | .576 | | .578 | | | | .578 | |
| 23. | | | | | | | | | | |
| 24. | | | | | | | | | | |
| 25. | | | | | | | | | | |
| 26. | | | | | | | | | | |
| 27. | | | | | | | | | | |
| 28. | | | | | | | | | | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No.________ Date 1/19/77 Location 19 Engr. BRIENZA

Unit No.________ Fuel #2 Capacity 17,500

Unit Type DS9-2 Burner Type WB 114.5 FABER

| | 19-73 | | 19-74 | | 19-75 | | 19-76 | | 19-77 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | ~~1-15~~ | | [illegible] | | [illegible] | | ~~2-2~~ | | ~~1-16~~ | |
| 2. Date | 1/19/77 | | 1/19/77 | | 1/19/77 | | 1/19/77 | | 1/20/77 | |
| 3. Time | 915 | | 1110 | | 1205 | | 1440 | | 750 | |
| 4. Load | 14500 | | 14500 | | 14500 | | 14500 | | 14500 | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | 2.5 | | 2.5 | | 2.5 | | 2.5 | | 2.5 | |
| 7. Probe Position | CENTER | | CENTER | | CENTER | | CENTER | | CENTER | |
| 8. Oxygen (%) | 3.10 | | 1.15 | | 1.05 | | 1.08 | | 3.00 | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 98 | 98 | 92 | 83 | 92 | 83 | 92 | 83 | 105 | 105 |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 98 | 98 | 92 | 83 | 92 | 83 | 92 | 83 | 105 | 105 |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 0 | | 0 | | | | | | | |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 112 | 112 | 107 | 97 | 106 | 96 | 107 | 97 | 117 | 117 |
| 13. Carbon Dioxide (%) | | | | | | | | | | |
| 14. Carbon Monoxide (ppm) uncor/cor* | 6 | 6 | 200 | 181 | 300 | 270 | 200 | 181 | 8 | 8 |
| 15. Hydrocarbon (ppm) uncor/cor* | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | — | — |
| 16. Sulfur Dioxide (ppm) uncor/cor* | 70 | 70 | 85 | 77 | 85 | 77 | 90 | 81 | 85 | 85 |
| 17. Smoke Spot (Bacharach) | 0 | | 5 | | 4.5 | | 4.5 | | 0 | |
| 18. Atmos. Temp. (°F/°C) | 7 | | 10 | | 14 | | 20 | | 25 | |
| 19. Dew Point Temp. (°F/°C) | | | | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | 29.73 | | 29.73 | | 29.72 | | 29.70 | | 29.80 | |
| 21. Relative Humidity (%) | 63 | | 58 | | 51 | | 50 | | | |
| 22. %S IN FUEL | .120 | | .133 | | .132 | | | | | |
| 23. | | | | | | | | | | |
| 24. | | | | | | | | | | |
| 25. | | | | | | | | | | |
| 26. | | | | | | | | | | |
| 27. | | | | | | | | | | |
| 28. | | | | | | | | | | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No.__________ Date 1/20/77 Location 19 Engr. BRIENZA

Unit No.__________ Fuel #2 Capacity 17500

Unit Type DS9-2 Burner Type WB 114.5 FABER

| | 19-78 | | 19-79 | | 19-80 | | 19-81 | | 19-82 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | |
| 2. Date | 1/20/77 | | 1/20/77 | | 1/20/77 | | 1/20/77 | | 1/20/77 | |
| 3. Time | 820 | | 840 | | 915 | | 955 | | 1005 | |
| 4. Load | 14500 | | 14500 | | 14500 | | 14500 | | 14500 | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | 2.5 | | 2.5 | | 2.5 | | 2.5 | | 2.5 | |
| 7. Probe Position | CENTER | | CENTER | | CENTER | | CENTER | | CENTER | |
| 8. Oxygen (%) | 1.85 | | 1.79 | | 1.77 | | 1.92 | | 1.90 | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 87 | 82 | 83 | 78 | 71 | 66 | 77 | 73 | 76 | 71 |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 87 | 82 | 83 | 78 | 71 | 66 | 77 | 73 | 76 | 71 |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 102 | 96 | 95 | 89 | 82 | 77 | 87 | 82 | 86 | 81 |
| 13. Carbon Dioxide (%) | | | | | | | | | | |
| 14. Carbon Monoxide (ppm) uncor/cor* | 44 | 41 | 50 | 47 | 500 | 468 | 140 | 132 | 45 | 42 |
| 15. Hydrocarbon (ppm) uncor/cor* | 3 | 3 | 5 | 5 | 20 | 19 | 8 | 8 | 15 | 15 |
| 16. Sulfur Dioxide (ppm) uncor/cor* | — | | — | | — | | 100 | 94 | 100 | 94 |
| 17. Smoke Spot (Bacharach) | 5.8 | | 5.5 | | 8.0 | | 6.8 | | 7.0 | |
| 18. Atmos. Temp. (°F/°C) | 25 | | 25 | | 25 | | 27 | | 27 | |
| 19. Dew Point Temp. (°F/°C) | | | | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | 29.80 | | 29.80 | | 29.80 | | 29.85 | | 29.85 | |
| 21. Relative Humidity (%) | 65 | | 65 | | 65 | | 65 | | 65 | |
| 22. % S IN FUEL | | | | | | | .162 | | .162 | |
| 23. | | | | | | | | | | |
| 24. | | | | | | | | | | |
| 25. | | | | | | | | | | |
| 26. | | | | | | | | | | |
| 27. | | | | | | | | | | |
| 28. | | | | | | | | | | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

**MOBILE LABORATORY DATA** **Test No.**________

**Test No.**________ **Date** 1/20/77 **Location** 19 **Engr.** BRIENZA

**Unit No.**________ **Fuel** #2 **Capacity** 17500

**Unit Type** 059-2 **Burner Type** WB 114.5 FABER

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 19-82 | | 19-83 | | 19-84 | | 19-85 | | | |
| 1. Test No. | ~~3B1b~~ | | ~~4C21~~ | | ~~4C20~~ | | ~~4-21~~ | | | |
| 2. Date | 1/20/77 | | 1/20/77 | | 1/20/77 | | 1/20/77 | | | |
| 3. Time | | | 1400 | | 1500 | | 1630 | | | |
| 4. Load | 14500 | | 14500 | | 14500 | | 14500 | | | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | 2.5 | | 2.5 | | 2.5 | | 2.5 | | | |
| 7. Probe Position | CENTER | | CENTER | | CENTER | | CENTER | | | |
| 8. Oxygen (%) | | | .85 | | .70 | | 0.68 | | | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | | | 29 | 26 | 30 | 26 | 31 | 27 | | |
| 10. NO (hot) read/3% $O_2$ (ppm)* | | | 29 | 26 | 30 | 26 | 31 | 27 | | |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | | | 0 | 0 | 0 | 0 | 0 | | | |
| 12. NO (cold) read/3% $O_2$ (ppm)* | | | 35 | 31 | 36 | 32 | 37 | 33 | | |
| 13. Carbon Dioxide (%) | | | | | | | | | | |
| 14. Carbon Monoxide (ppm) uncor/cor* | | | 24 | 21 | 25 | 22 | 80 | 71 | | |
| 15. Hydrocarbon (ppm) uncor/cor* | | | 5 | 5 | 5 | 5 | 4 | 4 | | |
| 16. Sulfur Dioxide (ppm) uncor/cor* | | | 85 | 76 | 90 | 80 | 78 | 69 | | |
| 17. Smoke Spot (Bacharach) | | | 0 | | 0 | | — | | | |
| 18. Atmos. Temp. (°F/°C) | | | 27 | | 27 | | | | | |
| 19. Dew Point Temp. (°F/°C) | | | | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | | | 29.86 | | 29.86 | | 29.91 | | | |
| 21. Relative Humidity (%) | | | 65 | | 65 | | 65 | | | |
| 22. % S | | | 0.131 | | 0.137 | | 0.12 | | | |
| 23. | | | | | | | | | | |
| 24. | | | | | | | | | | |
| 25. | | | | | | | | | | |
| 26. | | | | | | | | | | |
| 27. | | | | | | | | | | |
| 28. | | | | | | | | | | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No.________ Date 1-21-77 Location 19 Engr. [illegible]

Unit No.________ Fuel #2 Capacity 17.5 K

Unit Type DS9-2 Burner Type________

| | 19-86 | | 19-87 | | 19-88 | | 19-89 | | 19-90 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | | | | | | | | | | |
| 2. Date | 1-21-77 | | 1-21-77 | | 1-21-77 | | 1-21-77 | | 1-21-77 | |
| 3. Time | 1027 | | 1135 | | 1345 | | 1400 | | 1420 | |
| 4. Load | 14.5K | | 14.5K | | 14.5K | | 14.5K | | 14.5K | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | 2.5 | | 2.5 | | 2.5 | | 2.5 | | 2.5 | |
| 7. Probe Position | CENTER | | CENTER | | CENTER | | CENTER | | CENTER | |
| 8. Oxygen (%) | 2.9 | | 2.8 | | 2.5 | | 2.55 | | 2.55 | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 74 | 74 | 62 | 61 | 67 | 65 | 58 | 57 | 57 | 56 |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 72 | 72 | 61 | 60 | 66 | 64 | 58 | 57 | 56 | 55 |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 2 | 2 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 82 | 82 | 70 | 69 | 77 | 75 | 68 | 66 | 66 | 64 |
| 13. Carbon Dioxide (%) | | | | | | | | | | |
| 14. Carbon Monoxide (ppm) uncor/cor* | 32 | 32 | 105 | 104 | 8 | 8 | 64 | 62 | 48 | 47 |
| 15. Hydrocarbon (ppm) uncor/cor* | 3 | 3 | 4 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| 16. Sulfur Dioxide (ppm) uncor/cor* | 40 | 40 | 60 | 59 | 80 | 78 | 80 | 78 | 80 | 79 |
| 17. Smoke Spot (Bacharach) | 4.5 | | 6.5 | | 3 | | 6.5 | | 5.5 | |
| 18. Atmos. Temp. (°F/°C) | | | | | 23 | | 23 | | 23 | |
| 19. Dew Point Temp. (°F/°C) | | | | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | 30.03 | | 30.03 | | 29.95 | | 29.95 | | 29.95 | |
| 21. Relative Humidity (%) | | | | | 60% | | 60% | | 60% | |
| 22. | | | | | | | | | | |
| 23. | | | | | | | | | | |
| 24. | | | | | | | | | | |
| 25. | | | | | | | | | | |
| 26. | | | | | | | | | | |
| 27. | | | | | | | | | | |
| 28. | | | | | | | | | | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

**MOBILE LABORATORY DATA** Test No.________

Test No.________ Date 1-21-77 Location 19 Engr. MAH

Unit No.________ Fuel #2 oil Capacity 17.5 K

Unit Type DS9-2 Burner Type________

| | 19-91 | | 19-92 | | 19-93 | | 19-94 | | 19-95 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | ~~302C~~ | | [illegible] | | [illegible] | | [illegible] | | [illegible] | |
| 2. Date | 1-21-77 | | 1-21-77 | | 1-21-77 | | 1-21-77 | | 1-21-77 | |
| 3. Time | 1435 | | 1500 | | 1512 | | 1538 | | 1549 | |
| 4. Load | 14.5 | | 14.5 | | 14.5 | | 14.5 | | 14.5 | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | 2.5 | | 2.5 | | 2.5 | | 2.5 | | 2.5 | |
| 7. Probe Position | CENTER | | CENTER | | CENTER | | CENTER | | CENTER | |
| 8. Oxygen (%) | 2.45 | | 1.6 | | 1.6 | | 1.5 | | 1.55 | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 64 | 62 | 69 | 63 | 64 | 58 | 62 | 57 | 71 | 65 |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 62 | 60 | 68 | 63 | 62 | 57 | 61 | 56 | 69 | 63 |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 2 | 2 | 1 | 0 | 2 | 1 | 1 | 1 | 2 | 2 |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 69 | 67 | 78 | 72 | 72 | 66 | 71 | 65 | 73 | 67 |
| 13. Carbon Dioxide (%) | | | | | | | | | | |
| 14. Carbon Monoxide (ppm) uncor/cor* | 104 | 101 | 124 | 114 | 380 | 349 | 400 | 368 | 420 | 386 |
| 15. Hydrocarbon (ppm) uncor/cor* | 0 | 0 | 2 | 2 | 4 | 4 | 4 | 4 | 0 | 0 |
| 16. Sulfur Dioxide (ppm) uncor/cor* | 80 | 78 | 85 | 78 | 80 | 74 | 80 | 74 | 80 | 74 |
| 17. Smoke Spot (Bacharach) | 6.5 | | 5.0 | | 6.5 | | 6.0 | | 7.0 | |
| 18. Atmos. Temp. (°F/°C) | 23 | | 25 | | 25 | | 25 | | 25 | |
| 19. Dew Point Temp. (°F/°C) | | | | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | 29.95 | | 29.89 | | 29.89 | | 29.89 | | 29.89 | |
| 21. Relative Humidity (%) | 60% | | 55% | | 55% | | 55% | | 55% | |
| 22. | | | | | | | | | | |
| 23. | | | | | | | | | | |
| 24. | | | | | | | | | | |
| 25. | | | | | | | | | | |
| 26. | | | | | | | | | | |
| 27. | | | | | | | | | | |
| 28. | | | | | | | | | | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No.________ Date________ Location 17 Engr. [illegible]

Unit No.________ Fuel________ Capacity 17500

Unit Type DS9-2 Burner Type WB 114.5 FABER

| | 19-96 | | 19-97 | | 19-98 | | 19-99 | | 19-100 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | |
| 2. Date | 1 24 77 | | 1 24 77 | | 1 24 77 | | 1 24 77 | | 1 27 77 | |
| 3. Time | 825 | | 1020 | | 1130 | | 1450 | | 835 | |
| 4. Load | 14500 | | 14500 | | 14500 | | 14500 | | 14500 | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | 2.5 | | 2.5 | | 2.5 | | 2.5 | | 2.5 | |
| 7. Probe Position | CENTER | | CENTER | | CENTER | | CENTER | | CENTER | |
| 8. Oxygen (%) | 3.10 | | 3.00 | | 3.3 | | 3.10 | | 3.15 | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 103 | | 195 | | 196 | 199 | 197 | 198 | 88 | 89 |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 103 | | 195 | | 196 | 199 | 197 | 198 | 88 | 89 |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 117 | 118 | 214 | 214 | 212 | 215 | 218 | 219 | 108 | 109 |
| 13. Carbon Dioxide (%) | | | | | | | | | | |
| 14. Carbon Monoxide (ppm) uncor/cor* | 8 | | 4 | | 2 | 2 | 4 | 4 | 4 | 4 |
| 15. Hydrocarbon (ppm) uncor/cor* | 5 | | 10 | | 0 | 0 | 5 | 5 | 5 | 5 |
| 16. Sulfur Dioxide (ppm) uncor/cor* | 60 | | 300 | 300 | 280 | 285 | 320 | 321 | 70 | 71 |
| 17. Smoke Spot (Bacharach) | - | | 0.5 | | 0.5 | | 0 | | 0 | |
| 18. Atmos. Temp. (°F/°C) | 13 | | 20 | | 26 | | 2 | | 26 | |
| 19. Dew Point Temp. (°F/°C) | | | | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | 30.18 | | 30.16 | | 30.14 | | 30.00 | | 29.80 | |
| 21. Relative Humidity (%) | 77 | | 77 | | 77 | | | | | |
| 22. %S IN FUEL | | | 0.52 | | .49 | | .551 | | .122 | |
| 23. | | | | | | | | | | |
| 24. | | | | | | | | | | |
| 25. | | | | | | | | | | |
| 26. | | | | | | | | | | |
| 27. | | | | | | | | | | |
| 28. | | | | | | | | | | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

**MOBILE LABORATORY DATA** **Test No.**________

**Test No.**________ **Date**________ **Location** 19 **Engr.** BREUZA

**Unit No.**________ **Fuel** #2 **Capacity** 17500

**Unit Type** D59-2 **Burner Type** WB 114.5 FABER

| | 19-101 | | 19-102 | | 19-103 | | 19-104 | | 19-105 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | 5A1b | | 5G1b | | ~~5A1b~~ | | 5B1b | | 5C1b | |
| 2. Date | 1/25/77 | | 1/25/77 | | 1/25/77 | | 1/25/77 | | 1/25/77 | |
| 3. Time | 1000 | | 1010 | | 1035 | | 1100 | | 1125 | |
| 4. Load | 14500 | | 14500 | | 14500 | | 14500 | | 14500 | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | 2.5 | | 2.5 | | 2.5 | | 2.5 | | 2.5 | |
| 7. Probe Position | CENTER | | CENTER | | CENTER | | CENTER | | CENTER | |
| 8. Oxygen (%) | 3.04 | | 2.95 | | 2.90 | | 2.90 | | 3.00 | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 53 | 53 | 53 | 53 | 34 | 34 | 34 | 34 | 25 | 25 |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 53 | 53 | 53 | 53 | 34 | 34 | 34 | 34 | 25 | 25 |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 61 | 61 | 61 | 61 | 40 | 40 | 40 | 40 | 27 | 27 |
| 13. Carbon Dioxide (%) | | | | | | | | | | |
| 14. Carbon Monoxide (ppm) uncor/cor* | 6 | 6 | 20 | 20 | 10 | 10 | 10 | 10 | 15 | 15 |
| 15. Hydrocarbon (ppm) uncor/cor* | 5 | 5 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 16. Sulfur Dioxide (ppm) uncor/cor* | 85 | 85 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 |
| 17. Smoke Spot (Bacharach) | 1.5 | | 4 | | .5 | | .5 | | 2 | |
| 18. Atmos. Temp. (°F/°C) | 30 | | 30 | | 30 | | 31 | | 35 | |
| 19. Dew Point Temp. (°F/°C) | | | | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | 29.77 | | 29.77 | | 29.75 | | 29.75 | | 29.75 | |
| 21. Relative Humidity (%) | 90 | | 90 | | 90 | | 90 | | 90 | |
| 22. % S IN FUEL | .146 | | .138 | | .138 | | .138 | | .138 | |
| 23. | | | | | | | | | | |
| 24. | | | | | | | | | | |
| 25. | | | | | | | | | | |
| 26. | | | | | | | | | | |
| 27. | | | | | | | | | | |
| 28. | | | | | | | | | | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.__________

Test No.__________ Date__________ Location 19 Engr. [illegible]

Unit No.__________ Fuel [illegible] Capacity 17500

Unit Type D59-2 Burner Type WB 114.5 FABER

| | 19-106 | | 19-107 | | 19-108 | | 19-109 | | 19-110 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | |
| 2. Date | 1/25/77 | | 1/25/77 | | 1/25/77 | | 1/25/77 | | 1/25/77 | |
| 3. Time | 1135 | | 1330 | | 1340 | | 1350 | | 1400 | |
| 4. Load | 14500 | | 14500 | | 14500 | | 14500 | | 14500 | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | 2.5 | | 2.5 | | 2.5 | | 2.5 | | 2.5 | |
| 7. Probe Position | CENTER | | CENTER | | CENTER | | CENTER | | CENTER | |
| 8. Oxygen (%) | 3.00 | | 3.20 | | 3.19 | | 3.07 | | 3.11 | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 26 | 26 | 157 | 159 | 157 | 159 | 151 | 151 | 150 | 151 |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 26 | 26 | 157 | 159 | 157 | 159 | 151 | 151 | 150 | 151 |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 0 | 0 | 0 | | 0 | | 0 | 0 | 0 | |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 29 | 29 | 175 | 177 | 174 | 176 | 173 | 173 | 170 | 171 |
| 13. Carbon Dioxide (%) | — | | | | | | | | | |
| 14. Carbon Monoxide (ppm) uncor/cor* | 16 | 16 | 6 | 6 | 8 | 8 | 15 | 15 | 32 | 32 |
| 15. Hydrocarbon (ppm) uncor/cor* | 3 | 3 | 0 | 0 | 2 | 2 | 2 | 2 | 5 | 5 |
| 16. Sulfur Dioxide (ppm) uncor/cor* | 80 | 80 | 280 | 283 | 280 | 283 | 280 | 280 | 285 | 187 |
| 17. Smoke Spot (Bacharach) | 0.2 | | 3.0 | | 4.5 | | 4.5 | | 5.1 | |
| 18. Atmos. Temp. (°F/°C) | 36 | | 36 | | 36 | | 36 | | 36 | |
| 19. Dew Point Temp. (°F/°C) | | | | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | 29.75 | | 29.68 | | 29.68 | | 29.68 | | 29.68 | |
| 21. Relative Humidity (%) | 90 | | 72 | | 72 | | 72 | | 72 | |
| 22. % S IN FUEL | .138 | | .488 | | .488 | | .483 | | .494 | |
| 23. | | | | | | | | | | |
| 24. | | | | | | | | | | |
| 25. | | | | | | | | | | |
| 26. | | | | | | | | | | |
| 27. | | | | | | | | | | |
| 28. | | | | | | | | | | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No.________ Date 1/25/77 Location 19 Engr. [illegible]

Unit No.________ Fuel #6 Capacity 17500

Unit Type D59-2 Burner Type WB 114.5 FABER

| | 19 111 | | 19-112 | | 19-113 | | 19-114 | | 19-115 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | ~~[illegible]~~ | | ~~[illegible]~~ | | ~~[illegible]~~ | | ~~[illegible]~~ | | ~~[illegible]~~ | |
| 2. Date | 1/25/77 | | 1/25/77 | | 1/25/77 | | 1/25/77 | | 1/26/77 | |
| 3. Time | 1420 | | 1435 | | 1500 | | 1510 | | 0900 | |
| 4. Load | 14500 | | 14500 | | 14500 | | 14500 | | 14500 | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | 2.5 | | 2.5 | | 2.5 | | 2.5 | | 2.5 | |
| 7. Probe Position | CENTER | | CENTER | | CENTER | | CENTER | | CENTER | |
| 8. Oxygen (%) | 3.05 | | 3.10 | | 1.75 | | 1.90 | | 3.10 | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 132 | 132 | 130 | 131 | 127 | 119 | 116 | 109 | 108 | 108 |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 132 | 132 | 130 | 131 | 127 | 119 | 116 | 109 | 108 | 108 |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 150 | 150 | 148 | 149 | 148 | 138 | 133 | 125 | 125 | 126 |
| 13. Carbon Dioxide (%) | | | | | | | | | | |
| 14. Carbon Monoxide (ppm) uncor/cor* | 60 | 60 | 80 | 80 | 100 | 93 | 2000 | 1884 | 6 | 6 |
| 15. Hydrocarbon (ppm) uncor/cor* | 5 | 5 | 5 | 5 | 12 | 12 | 150 | 141 | 0 | |
| 16. Sulfur Dioxide (ppm) uncor/cor* | 285 | 286 | 285 | 286 | 320 | 299 | 320 | 301 | 60 | 60 |
| 17. Smoke Spot (Bacharach) | 6.5 | | 7.0 | | 8 | | 10 | | 0 | |
| 18. Atmos. Temp. (°F/°C) | 36 | | 36 | | 36 | | 36 | | 26 | |
| 19. Dew Point Temp. (°F/°C) | | | | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | 29.66 | | 29.66 | | 29.66 | | 29.66 | | 29.74 | |
| 21. Relative Humidity (%) | 72 | | 72 | | 72 | | 72 | | 75 | |
| 22. % S IN FUEL | .493 | | .493 | | .515 | | .520 | | .103 | |
| 23. | | | | | | | | | | |
| 24. | | | | | | | | | | |
| 25. | | | | | | | | | | |
| 26. | | | | | | | | | | |
| 27. | | | | | | | | | | |
| 28. | | | | | | | | | | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

## MOBILE LABORATORY DATA

Test No.________

Test No.__________ Date [illegible] Location 19 Engr. [illegible]

Unit No.__________ Fuel #2 Capacity 17500

Unit Type DS9-2 Burner Type WB 114.5 FABER

| | 19-116 | | 19-117 | | 19-118 | | 19-119 | | 19-120 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | |
| 2. Date | 1/26/77 | | | | 2/15/77 | | 2/16/77 | | 2/16/77 | |
| 3. Time | 1040 | | 1200 | | 1410 | | 1035 | | 1110 | |
| 4. Load | 14500 | | 14500 | | 14500 | | 14500 | | 14500 | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | 2.5 | | 2.5 | | 2.5 | | 2.5 | | 2.5 | |
| 7. Probe Position | CENTER | | CENTER | | CENTER | | CENTER | | CENTER | |
| 8. Oxygen (%) | 3.1 | | 3.18 | | 3.2 | | 2.9 | | 6.3 | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 82 | 83 | 83 | 84 | 117 | 118 | 100 | 100 | 87 | 107 |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 82 | 83 | 83 | 84 | 117 | 118 | 100 | 100 | 87 | 107 |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 96 | 97 | 97 | 98 | 132 | 134 | 115 | 114 | 92 | 113 |
| 13. Carbon Dioxide (%) | | | | | | | | | | |
| 14. Carbon Monoxide (ppm) uncor/cor* | 35 | 35 | 24 | 24 | 9 | 9 | 8 | 8 | 6 | 7 |
| 15. Hydrocarbon (ppm) uncor/cor* | 5 | 5 | 0 | 0 | 5 | 5 | 3 | 3 | 2 | 2.5 |
| 16. Sulfur Dioxide (ppm) uncor/cor* | 80 | 81 | 90 | 91 | 80 | 81 | 90 | 90 | 70 | 86 |
| 17. Smoke Spot (Bacharach) | 4 | | 5.5 | | 0 | | 0 | | 0 | |
| 18. Atmos. Temp. (°F/°C) | 26 | | 30 | | 34 | | 19 | | 20 | |
| 19. Dew Point Temp. (°F/°C) | | | | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | 29.74 | | 29.70 | | 29.97 | | 30.12 | | 30.11 | |
| 21. Relative Humidity (%) | 75 | | | | 50% | | 47% | | 47% | |
| 22. %S IN FUEL FROM $SO_2$ | | | | | .14% | | .155% | | .148% | |
| 23. | | | | | | | | | | |
| 24. | | | | | | | | | | |
| 25. | | | | | | | | | | |
| 26. | | | | | | | | | | |
| 27. | | | | | | | | | | |
| 28. | | | | | | | | | | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

**MOBILE LABORATORY DATA** **Test No.**

**Test No.** **Date** **Location** 19 **Engr.** G. S[illegible]
TECH. R. [illegible]

**Unit No.** **Fuel** #2 OIL **Capacity** 17500

**Unit Type** DS9-2 **Burner Type** WB 114.5 FABER

| | 19-121 | | 19-122 | | 19-123 | | 19-124 | | 19-125 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | CALIB. | | ~~CALIB.~~ | | ~~CALIB.~~ | | ~~CALIB.~~ | | ~~CALIB.~~ | |
| 2. Date | 2/16/77 | | 2/16/77 | | 2/16/77 | | 2/16/77 | | 2/16/77 | |
| 3. Time | 1135 | | 1150 | | 1205 | | 1210 | | 1225 | |
| 4. Load | 14500 | | 14500 | | 14500 | | 14500 | | 14500 | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | 2.5 | | 2.5 | | 2.5 | | 2.5 | | 2.5 | |
| 7. Probe Position | CENTER | | CENTER | | CENTER | | CENTER | | CENTER | |
| 8. Oxygen (%) | 6.2 | | 6.5 | | 6.4 | | 5.75 | | 5.75 | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 85 | 103 | 83 | 103 | 84 | 104 | 86 | 102 | 87 | 103 |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 85 | 103 | 83 | 103 | 84 | 104 | 86 | 102 | 87 | 103 |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 92 | 112 | 92 | 114 | 93 | 115 | 96 | 113 | 98 | 116 |
| 13. Carbon Dioxide (%) | | | | | | | | | | |
| 14. Carbon Monoxide (ppm) uncor/cor* | 6 | 7 | 8 | 10 | 8 | 10 | 8 | 9 | 8 | 9 |
| 15. Hydrocarbon (ppm) uncor/cor* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 4 |
| 16. Sulfur Dioxide (ppm) uncor/cor* | 70 | 85 | 60 | 75 | 55 | 68 | 55 | 65 | 75 | 89 |
| 17. Smoke Spot (Bacharach) | 0 | | 0 | | 0 | | | | | |
| 18. Atmos. Temp. (°F/°C) | 20 | | 20 | | 20 | | 22 | | 22 | |
| 19. Dew Point Temp. (°F/°C) | | | | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | 30.11 | | 30.11 | | 30.11 | | 30.09 | | 30.09 | |
| 21. Relative Humidity (%) | 47 | | 47 | | 47 | | 45 | | 45 | |
| 22. % SULFUR IN FUEL FROM $SO_2$ | .147 | | .128 | | .117 | | .112 | | .153 | |
| 23. | | | | | | | | | | |
| 24. | | | | | | | | | | |
| 25. | | | | | | | | | | |
| 26. | | | | | | | | | | |
| 27. | | | | | | | | | | |
| 28. | | | | | | | | | | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No.________ Date________ Location 19 Engr. G. SOTTER

TECH. R. PICUFSSA

Unit No.________ Fuel #2 or #6 Capacity 17500

Unit Type PS9-2 Burner Type WB 114.5 FABER

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 19-126 | | 19-127 | | 19-128 | | 19-129 | | 19-130 | |
| 1. Test No. | CALIB. | | ~~CALIB.~~ | | | | | | | |
| 2. Date | 2/16/77 | | 2/16/77 | | 2/16/77 | | 2/16/77 | | 2/16/77 | |
| 3. Time | 1240 | | 1250 | | 1550 | | 1630 | | 1650 | |
| 4. Load | 14500 | | 14500 | | 14500 | | 14500 | | 14500 | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | 2.5 | | 2.5 | | 2.5 | | 2.5 | | 2.5 | |
| 7. Probe Position | CENTER | | CENTER | | CENTER | | CENTER | | CENTER | |
| 8. Oxygen (%) | 5.28 | | 6.25 | | 3.25 | | 3.1 | | 2.9 | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 88 | 101 | 89 | 102 | 200 | 203 | 136 | 137 | 93 | 93 |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 88 | 101 | 89 | 102 | 200 | 203 | 136 | 137 | 93 | 93 |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 99 | 113 | 99 | 113 | 220 | 223 | 147 | 148 | 105 | 104 |
| 13. Carbon Dioxide (%) | | | | | | | | | | |
| 14. Carbon Monoxide (ppm) uncor/cor* | 8 | 9 | 8 | 9 | 14 | 14 | 24 | 24 | 340 | 338 |
| 15. Hydrocarbon (ppm) uncor/cor* | 3 | 3 | 2 | 2 | 7 | 7 | 8 | 8 | 45 | 45 |
| 16. Sulfur Dioxide (ppm) uncor/cor* | 70 | 80 | 80 | 91 | 330 | 335 | 360 | 322 | 330 | 328 |
| 17. Smoke Spot (Bacharach) | | | | | 1 | | 2 | | 2 | |
| 18. Atmos. Temp. (°F/°C) | 22 | | 22 | | 25 | | 24 | | 24 | |
| 19. Dew Point Temp. (°F/°C) | | | | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | 30.09 | | 30.09 | | 30.02 | | 30.02 | | 30.02 | |
| 21. Relative Humidity (%) | 45 | | 45 | | 42 | | 40 | | 40 | |
| 22. % SULFUR IN FUEL FROM $SO_2$ | .138 | | .158 | | .578 | | .624 | | .566 | |
| 23. | | | | | | | | | | |
| 24. | | | | | | | | | | |
| 25. | | | | | | | | | | |
| 26. | | | | | | | | | | |
| 27. | | | | | | | | | | |
| 28. | | | | | | | | | | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.

Test No. Date Location 19 Engr. G. [illegible]

TECH. R. [illegible]

P. [illegible]

Unit No. Fuel #6 Capacity 17500

Unit Type DS9-2 Burner Type WB 114.5 FABER

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ←19-131 | | | →← | 19-132 | | | → | 19-133 | |
| 1. Test No. | ~~19-129~~ | | ~~[illegible]~~ | | ~~[illegible]~~ | | ~~[illegible]~~ | | ~~19-131~~ | |
| 2. Date | 2/17/77 | | 2/17/77 | | 2/17/77 | | 2/17/77 | | 2/18/77 | |
| 3. Time | 826 | | 841 | | 942 | | 1106 | | 820 | |
| 4. Load | 14500 | | 14500 | | 14500 | | 14500 | | 14500 | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | 2.5 | | 2.5 | | 2.5 | | 2.5 | | 2.5 | |
| 7. Probe Position | CENTER | | CENTER | | CENTER | | CENTER | | CENTER | |
| 8. Oxygen (%) | 3.20 | | 3.60 | | 0.98 | | 0.95 | | 3.60 | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 193 | 195 | 202 | 209 | 143 | 128 | 150 | 135 | 199 | 206 |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 193 | 195 | 202 | 209 | 141 | 127 | 150 | 135 | 199 | 206 |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 223 | 226 | 229 | 237 | 166 | 149 | 167 | 150 | 224 | 232 |
| 13. Carbon Dioxide (%) | | | | | | | | | | |
| 14. Carbon Monoxide (ppm) uncor/cor* | 25 | 25 | 7 | 7 | 204 | 183 | 120 | 108 | 4 | 4 |
| 15. Hydrocarbon (ppm) uncor/cor* | 5 | 5 | 5 | 5 | 18 | 16 | 10 | 9 | 12 | 12 |
| 16. Sulfur Dioxide (ppm) uncor/cor* | 290 | 293 | 292 | 302 | 370 | 333 | 368 | 330 | 284 | 294 |
| 17. Smoke Spot (Bacharach) | | | 0 | | 2.5 | | 3.0 | | 0 | |
| 18. Atmos. Temp. (°F/°C) | 15 | | 15 | | 17 | | 20 | | 10 | |
| 19. Dew Point Temp. (°F/°C) | | | | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | 30.11 | | 30.12 | | 30.12 | | 30.12 | | 30.17 | |
| 21. Relative Humidity (%) | 58 | | 51 | | 51 | | 45 | | 70 | |
| 22. %S IN FUEL FROM $SO_2$ | 0.51 | | 0.52 | | 0.57 | | 0.57 | | 0.51 | |
| 23. | | | | | | | | | | |
| 24. | | | | | | | | | | |
| 25. | | | | | | | | | | |
| 26. | | | | | | | | | | |
| 27. | | | | | | | | | | |
| 26. | | | | | | | | | | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

## MOBILE LABORATORY DATA

Test No.

Test No. Date Location 19 Engr. G. [illegible]
P. LANGSJOEN

Unit No. Fuel #6 Capacity 17500

Unit Type DS9-2 Burner Type WB 114.5 FABER

| | 19-134 | | 19-135 | | 19-136 | | 19-137 | | 19-138 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | ~~19-132~~ | | ~~19-133~~ | | ~~19-134~~ | | ~~19-135~~ | | 19-135 | |
| 2. Date | 2/18/77 | | 2/18/77 | | 2/18/77 | | 2/18/77 | | 2/18/77 | |
| 3. Time | 1020 | | 1044 | | 121 | | 145 | | 200 | |
| 4. Load | 14500 | | 14500 | | 14500 | | 14500 | | 14500 | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | 2.5 | | 2.5 | | 2.5 | | 2.5 | | 2.5 | |
| 7. Probe Position | CENTER | | CENTER | | CENTER | | CENTER | | CENTER | |
| 8. Oxygen (%) | 1.5 | | 1.54 | | 1.65 | | 2.3 | | 2.3 | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 111 | 103 | 98 | 90 | 110 | 102 | 120 | 116 | 104 | 100 |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 110 | 102 | 96 | 89 | 109 | 101 | 120 | 116 | 104 | 100 |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 1 | 1 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 127 | 117 | 111 | 103 | 126 | 117 | 138 | 133 | 120 | 116 |
| 13. Carbon Dioxide (%) | | | | | | | | | 13.6 | |
| 14. Carbon Monoxide (ppm) uncor/cor* | 88 | 81 | 700 | 647 | 756 | 238 | 60 | 58 | 86 | 83 |
| 15. Hydrocarbon (ppm) uncor/cor* | 30 | 28 | 30 | 28 | 125 | 116 | 25 | 24 | 15 | 14 |
| 16. Sulfur Dioxide (ppm) uncor/cor* | 310 | 285 | — | — | 364 | 339 | 334 | 321 | 330 | 318 |
| 17. Smoke Spot (Bacharach) | 2.5 | | 4 | | 2.5 | | 4 | | 1.5 | |
| 18. Atmos. Temp. (°F/°C) | 13 | | 13 | | 30 | | 30 | | 32 | |
| 19. Dew Point Temp. (°F/°C) | | | | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | 30.13 | | 30.13 | | 30.05 | | 30.05 | | 30.03 | |
| 21. Relative Humidity (%) | 75 | | 75 | | 40 | | 40 | | 40 | |
| 22. | 0.49 | | — | | 0.58 | | 0.55 | | 0.55 | |
| 23. | | | | | | | | | | |
| 24. | | | | | | | | | | |
| 25. | | | | | | | | | | |
| 26. | | | | | | | | | | |
| 27. | | | | | | | | | | |
| 28. | | | | | | | | | | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.

Test No. Date Location 19 Engr. SOTTER / LANGSTOEN

Unit No. Fuel #6 Capacity 17,500

Unit Type DS9-2 Burner Type WB 114.5 FABER

| | 19-139 | | 19-140 | | 19-141 | | 19-142 | | 19-143 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | ~~19-137~~ | | ~~19-138~~ | | ~~19-139~~ | | [illegible] | | ~~19-141 P~~ | |
| 2. Date | 2/18/77 | | 2/18/77 | | 2/18/77 | | 2/21/77 | | 2/21/77 | |
| 3. Time | 2:17 | | 2:50 | | | | 09:15 | | 10:00 | |
| 4. Load | 14,500 | | 14,500 | | 14,500 | | 14,500 | | 14,500 | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | 2.5 | | 2.5 | | 2.5 | | 2.5 | | 2.5 | |
| 7. Probe Position | CENTER | | CENTER | | CENTER | | CENTER | | CENTER | |
| 8. Oxygen (%) | 2.0 | | 2.97 | | 2.90 | | 3.14 | | 3.2 | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 128 | 121 | 132 | 132 | 108 | 107 | 200 | 201 | 131 | 133 |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 128 | 121 | 132 | 132 | 108 | 107 | 200 | 201 | 130 | 131 |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 145 | 137 | 148 | 147 | 123 | 122 | 225 | 227 | 148 | 149 |
| 13. Carbon Dioxide (%) | 14.5 | | 13.9 | | 13.6 | | 12.9 | | 13.5 | |
| 14. Carbon Monoxide (ppm) uncor/cor* | 80 | 76 | 20 | 20 | 680 | 676 | 8 | 8 | 24 | 24 |
| 15. Hydrocarbon (ppm) uncor/cor* | 30 | 28 | 15 | 15 | 75 | 75 | 5 | 5 | 5 | 5 |
| 16. Sulfur Dioxide (ppm) uncor/cor* | | | | | | | 340 | 343 | 300 | 303 |
| 17. Smoke Spot (Bacharach) | 5 | | 1.5 | | 3 | | 0 | | 2.5 | |
| 18. Atmos. Temp. (°F/°C) | 32 | | 32 | | 32 | | 19 | | | |
| 19. Dew Point Temp. (°F/°C) | | | | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | 30.03 | | 30.03 | | 30.01 | | 29.83 | | | |
| 21. Relative Humidity (%) | 40 | | 40 | | 38 | | 65 | | | |
| 22. % SULFUR IN FUEL (FROM $SO_2$) | | | | | | | .59 | | .52 | |
| 23. | | | | | | | | | | |
| 24. | | | | | | | | | | |
| 25. | | | | | | | | | | |
| 26. | | | | | | | | | | |
| 27. | | | | | | | | | | |
| 28. | | | | | | | | | | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

## MOBILE LABORATORY DATA

Test No.________

Test No.________ Date________ Location 19 Engr. [illegible]

Unit No.________ Fuel #6, 2 Capacity 17,500

Unit Type DS 9-2 Burner Type WB 114.5 FABER

19-144 19-145 19-146

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1. Test No. | 19-141 I | | [illegible] | | [illegible] | | | |
| 2. Date | 2/21/77 | | 2/21/77 | | 2/22/77 | | | |
| 3. Time | 1145 | | 1440 | | 838 | | | |
| 4. Load | 14500 | | 14500 | | 14500 | | | |
| 5. Process Rate | | | | | | | | |
| 6. Flue Diam. or Size, ft | 2.5 | | 2.5 | | 2.5 | | | |
| 7. Probe Position | CENTER | | CENTER | | CENTER | | | |
| 8. Oxygen (%) | 3.1 | | 3.1 | | 2.75 | | | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 128 | 129 | 125 | 126 | 105 | 104 | | |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 128 | 129 | — | — | 105 | 104 | | |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 0 | 0 | — | — | 0 | 0 | | |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 145 | 146 | 138 | 138 | 124 | 122 | | |
| 13. Carbon Dioxide (%) | 13.6 | | 13.4 | | | | | |
| 14. Carbon Monoxide (ppm) uncor/cor* | 32 | 32 | 60 | 60 | 16 | 16 | | |
| 15. Hydrocarbon (ppm) uncor/cor* | 5 | 5 | — | — | 11 | 11 | | |
| 16. Sulfur Dioxide (ppm) uncor/cor* | 300 | 302 | 320 | 322 | 104 | 103 | | |
| 17. Smoke Spot (Bacharach) | 3 | | — | | 0 | | | |
| 18. Atmos. Temp. (°F/°C) | 23 | | | | 24 | | | |
| 19. Dew Point Temp. (°F/°C) | | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | 29.89 | | | | 29.85 | | | |
| 21. Relative Humidity (%) | 45 | | | | 67 | | | |
| 22. %S IN FUEL (FROM $SO_2$) | .52 | | .55 | | .18 | | | |
| 23. | | | | | | | | |
| 24. | | | | | | | | |
| 25. | | | | | | | | |
| 26. | | | | | | | | |
| 27. | | | | | | | | |
| 28. | | | | | | | | |
| 29. | | | | | | | | |
| 30. | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

## MOBILE LABORATORY DATA

Test No.________

Test No.________ Date________ Location 19 Engr. SOTTER [illegible]

Unit No.________ Fuel GAS Capacity 17500 #/hr STEAM

Unit Type________ Burner Type________

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 19-147 | | 19-148 | | 19-149 | | 19-150 | | 19-151 | |
| 1. Test No. | ~~19-143~~ | | ~~19-144~~ | | ~~19-145~~ | | ~~19-146~~ | | ~~19-147~~ | |
| 2. Date | 2/22/77 | | 2/22/77 | | 2/22/77 | | 2/22/77 | | 2/22/77 | |
| 3. Time | 10:15 | | 10:40 | | 11:00 | | 11:20 | | 11:35 | |
| 4. Load | 14500 | | 14500 | | 14500 | | 14500 | | 14500 | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | 2.5 | | 2.5 | | 2.5 | | 2.5 | | 2.5 | |
| 7. Probe Position | CENTER | | CENTER | | CENTER | | CENTER | | CENTER | |
| 8. Oxygen (%) | 3.03 | | 7.00 | | 1.85 | | 1.05 | | 0.90 | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 75 | 75 | 50 | 64 | 81 | 76 | 85 | 77 | 85 | 76 |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 75 | 75 | 50 | 64 | 81 | 76 | 83 | 75 | 84 | 75 |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 1 | 1 |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 95 | 95 | 60 | 77 | 105 | 99 | 110 | 99 | 108 | 97 |
| 13. Carbon Dioxide (%) | 10.2 | | | | | | | | | |
| 14. Carbon Monoxide (ppm) uncor/cor* | 4 | 4 | 3 | 4 | 20 | 19 | 212 | 191 | 600 | 537 |
| 15. Hydrocarbon (ppm) uncor/cor* | 4 | 4 | 10 | 13 | 5 | 5 | 4 | 4 | 4 | 4 |
| 16. Sulfur Dioxide (ppm) uncor/cor* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 17. Smoke Spot (Bacharach) | 0 | | 0 | | 0 | | 0 | | 0 | |
| 18. Atmos. Temp. (°F/°C) | 25 | | 25 | | 25 | | 25 | | 25 | |
| 19. Dew Point Temp. (°F/°C) | | | | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | 29.83 | | 29.83 | | 29.81 | | 29.81 | | 29.81 | |
| 21. Relative Humidity (%) | 57 | | 57 | | 63 | | 63 | | 63 | |
| 22. | | | | | | | | | | |
| 23. | | | | | | | | | | |
| 24. | | | | | | | | | | |
| 25. | | | | | | | | | | |
| 26. | | | | | | | | | | |
| 27. | | | | | | | | | | |
| 28. | | | | | | | | | | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.

Test No. Date Location 19 Engr. [illegible]

Unit No. Fuel GAS Capacity 17500 #/hr STEAM

Unit Type Burner Type

| | 19-152 | | 19-153 | | 19-154 | | 19-155 | | 19-156 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | ~~19-145~~ | | [illegible] | | [illegible] | | [illegible] | | [illegible] | |
| 2. Date | 2/22/77 | | 2/22/77 | | 2/22/77 | | 2/22/77 | | 2/22/77 | |
| 3. Time | 13:30 | | 1:38 | | 1:42 | | 1:50 | | 2:15 | |
| 4. Load | 14500 | | 14500 | | 14500 | | 14500 | | 14500 | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | 2.5 | | 2.5 | | 2.5 | | 2.5 | | 2.5 | |
| 7. Probe Position | CENTER | | CENTER | | CENTER | | CENTER | | CENTER | |
| 8. Oxygen (%) | 3.05 | | 3.05 | | 3.05 | | 3.00 | | 2.25 | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 54 | 54 | | | | | 52 | 52 | 45 | 43 |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 54 | 54 | | | | | 52 | 52 | 45 | 43 |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 0 | 0 | | | | | 0 | 0 | 0 | 0 |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 69 | 69 | 68 | 68 | 65 | 65 | 66 | 66 | 57 | 55 |
| 13. Carbon Dioxide (%) | 9.7 | | | | | | 9.9 | | 10.2 | |
| 14. Carbon Monoxide (ppm) uncor/cor* | 24 | 24 | 22 | 22 | 16 | 16 | 48 | 48 | 680 | 653 |
| 15. Hydrocarbon (ppm) uncor/cor* | 7 | 7 | | | | | 10 | 10 | 5 | 5 |
| 16. Sulfur Dioxide (ppm) uncor/cor* | 0 | 0 | | | | | 0 | 0 | 0 | 0 |
| 17. Smoke Spot (Bacharach) | | | | | | | | | | |
| 18. Atmos. Temp. (°F/°C) | 35 | | 35 | | 35 | | 38 | | 38 | |
| 19. Dew Point Temp. (°F/°C) | | | | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | 29.74 | | 29.74 | | 29.74 | | 29.72 | | 29.72 | |
| 21. Relative Humidity (%) | 47 | | 47 | | 47 | | 45 | | 45 | |
| 22. | | | | | | | | | | |
| 23. | | | | | | | | | | |
| 24. | | | | | | | | | | |
| 25. | | | | | | | | | | |
| 26. | | | | | | | | | | |
| 27. | | | | | | | | | | |
| 28. | | | | | | | | | | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

**MOBILE LABORATORY DATA** Test No.

Test No. Date Location 19 Engr.

Unit No. Fuel GAS #6 Capacity 17500

Unit Type Burner Type WEBER

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 19-157 | | 19-158 | | - — 19-159 | | | | ——> | |
| 1. Test No. | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | |
| 2. Date | 2/22/77 | | 2/23/77 | | 2/23/77 | | 2/23/77 | | 2/23/77 | |
| 3. Time | 2:25 | | 8:20 | | 9:40 | | 10:40 | | 11:40 | |
| 4. Load | 14500 | | 14500 | | 14500 | | 14500 | | 14500 | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | 2.5 | | 2.5 | | 2.5 | | 2.5 | | 2.5 | |
| 7. Probe Position | CENTER | | CENTER | | CENTER | | CENTER | | CENTER | |
| 8. Oxygen (%) | 2.25 | | 2.95 | | 1.75 | | 1.70 | | 1.60 | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 51 | 49 | 195 | 194 | 138 | 129 | 138 | 129 | — | — |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 51 | 49 | 195 | 194 | 138 | 129 | 138 | 129 | — | — |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | — | — |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 65 | 62 | 223 | 222 | 160 | 150 | 158 | 147 | 155 | 144 |
| 13. Carbon Dioxide (%) | 9.5 | | 13.6 | | 14.5 | | 14.6 | | 14.8 | |
| 14. Carbon Monoxide (ppm) uncor/cor* | 28 | 27 | 24 | 24 | 96 | 90 | 80 | 75 | 152 | 141 |
| 15. Hydrocarbon (ppm) uncor/cor* | 0 | 0 | 9 | 9 | 5 | 5 | 0 | 0 | — | — |
| 16. Sulfur Dioxide (ppm) uncor/cor* | 0 | 0 | 310 | 309 | 344 | 322 | 360 | 336 | — | — |
| 17. Smoke Spot (Bacharach) | — | | 0 | | 1.5 | | 1.5 | | — | |
| 18. Atmos. Temp. (°F/°C) | 38 | | 37 | | 41 | | 44 | | 44 | |
| 19. Dew Point Temp. (°F/°C) | | | | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | 29.72 | | 30.07 | | 30.08 | | 30.09 | | | |
| 21. Relative Humidity (%) | 45 | | 82 | | 76 | | 73 | | | |
| 22. % S IN FUEL (FROM $SO_2$) | | | .53 | | .55 | | .58 | | | |
| 23. | | | | | | | | | | |
| 24. | | | | | | | | | | |
| 25. | | | | | | | | | | |
| 26. | | | | | | | | | | |
| 27. | | | | | | | | | | |
| 28. | | | | | | | | | | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

## MOBILE LABORATORY DATA

Test No.________

Test No.________ Date________ Location 19 Engr. [illegible]

Unit No.________ Fuel #6 OIL + GAS Capacity 17500

Unit Type________ Burner Type WEBER

| | 19-160 | | 19-161 | | 19-162 | | 19-163 | | 19-164 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | [illegible] | | [illegible] | | [illegible] | | [illegible] | | [illegible] | |
| 2. Date | 2/23/77 | | 2/23/77 | | 2/23/77 | | 2/23/77 | | 2/24/77 | |
| 3. Time | 2:15 | | 2:35 | | 3:00 | | 3:20 | | 8:05 | |
| 4. Load | 14500 | | 14500 | | 14500 | | 14500 | | 14500 | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | 2.5 | | 2.5 | | 2.5 | | 2.5 | | 2.5 | |
| 7. Probe Position | CENTER | | CENTER | | CENTER | | CENTER | | CENTER | |
| 8. Oxygen (%) | 3.02 | | 3.00 | | 3.00 | | 3.00 | | 2.8 | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 138 | 138 | 125 | 125 | 126 | 126 | 143 | 143 | 68 | 67 |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 138 | 138 | 125 | 125 | 126 | 126 | 143 | 143 | 68 | 67 |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 158 | 158 | 143 | 143 | 143 | 143 | 163 | 163 | 91 | 90 |
| 13. Carbon Dioxide (%) | | | 13.8 | | 14.0 | | 14.0 | | 10.7 | |
| 14. Carbon Monoxide (ppm) uncor/cor* | 64 | 64 | 88 | 88 | 132 | 132 | 52 | 52 | 18 | 18 |
| 15. Hydrocarbon (ppm) uncor/cor* | 10 | 10 | 7 | 7 | 15 | 15 | 3 | 3 | 10 | 10 |
| 16. Sulfur Dioxide (ppm) uncor/cor* | 330 | 330 | 340 | 340 | 340 | 340 | 340 | 340 | 0 | 0 |
| 17. Smoke Spot (Bacharach) | 1.5 | | 2 | | 2.5 | | 2.0 | | | |
| 18. Atmos. Temp. (°F/°C) | 56 | | — | | — | | — | | 40 | |
| 19. Dew Point Temp. (°F/°C) | | | | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | 30.03 | | — | | — | | — | | 29.93 | |
| 21. Relative Humidity (%) | | | | | | | | | | |
| 22. %S CALCULATE FROM $SO_2$ | .57 | | .59 | | .59 | | .59 | | 0 | |
| 23. | | | | | | | | | | |
| 24. | | | | | | | | | | |
| 25. | | | | | | | | | | |
| 26. | | | | | | | | | | |
| 27. | | | | | | | | | | |
| 28. | | | | | | | | | | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No.________ Date________ Location 19 Engr.________

Unit No.________ Fuel GAS Capacity 17500

Unit Type________ Burner Type________

| | 19-165 | | 19-166 | | 19-167 | | 19-168 | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | | | | | | | | | | |
| 2. Date | 2/24/77 | | 2/24/77 | | 2/24/77 | | 2/24/77 | | | |
| 3. Time | 9:00 | | 9:15 | | 9:30 | | 10:00 | | | |
| 4. Load | 14500 | | 14500 | | 14500 | | 14500 | | | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | 2.5 | | 2.5 | | 2.5 | | 2.5 | | | |
| 7. Probe Position | CENTER | | CENTER | | CENTER | | CENTER | | | |
| 8. Oxygen (%) | 3.1 | | 3.0 | | 1.73 | | 1.70 | | | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 66 | 66 | 68 | 68 | 57 | 53 | 58 | 54 | | |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 66 | 66 | 68 | 68 | 57 | 53 | 58 | 54 | | |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 84 | 84 | 86 | 86 | 73 | 68 | 75 | 70 | | |
| 13. Carbon Dioxide (%) | 10.6 | | 10.5 | | 11.3 | | 11.3 | | | |
| 14. Carbon Monoxide (ppm) uncor/cor* | 20 | 20 | 20 | 20 | 220 | 206 | 56 | 52 | | |
| 15. Hydrocarbon (ppm) uncor/cor* | 3 | 3 | 1 | 1 | 1 | 1 | 4 | | | |
| 16. Sulfur Dioxide (ppm) uncor/cor* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| 17. Smoke Spot (Bacharach) | | | | | | | | | | |
| 18. Atmos. Temp. (°F/°C) | 42 → | | | | | | | | | |
| 19. Dew Point Temp. (°F/°C) | | | | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | 29.90 → | | | | | | | | | |
| 21. Relative Humidity (%) | 82 → | | | | | | | | | |
| 22. | | | | | | | | | | |
| 23. | | | | | | | | | | |
| 24. | | | | | | | | | | |
| 25. | | | | | | | | | | |
| 26. | | | | | | | | | | |
| 27. | | | | | | | | | | |
| 28. | | | | | | | | | | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA Test No.________

Test No.________ Date________ Location 19 Engr.________

Unit No.________ Fuel #6 OIL Capacity 17500 #/hr STEAM

Unit Type________ Burner Type________

| | 19-169 | | ← 19-170 | | | | → | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | 19-165 | | [illegible] | | → | | → | | | |
| 2. Date | 3/1/77 | | 3/1/77 | | → | | → | | | |
| 3. Time | 0915 | | 1035 | | 1130 | | 1400 | | | |
| 4. Load | 14500 | | 14500 | | 14500 | | 14500 | | | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | 2.5 | | 2.5 | | 2.5 | | 2.5 | | | |
| 7. Probe Position | CENTER | | CENTER | | CENTER | | CENTER | | | |
| 8. Oxygen (%) | 3.0 | | 4.2 | | 4.2 | | 4.2 | | | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 185 | 185 | 135 | 145 | 136 | 146 | 134 | 144 | | |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 185 | 185 | 135 | 145 | 136 | 146 | 134 | 144 | | |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 215 | 215 | 150 | 161 | 152 | 163 | 153 | 164 | | |
| 13. Carbon Dioxide (%) | 14.0 | | 13.2 | | 13.3 | | 13.2 | | | |
| 14. Carbon Monoxide (ppm) uncor/cor* | 17 | 17 | 25 | 27 | 8 | 9 | 10 | 11 | | |
| 15. Hydrocarbon (ppm) uncor/cor* | 10 | 10 | 0 | 0 | 1 | 1 | 10 | 11 | | |
| 16. Sulfur Dioxide (ppm) uncor/cor* | 330 | 330 | 320 | 343 | 300 | 321 | 315 | 337 | | |
| 17. Smoke Spot (Bacharach) | | | 1.5 | | 1.5 | | 1.5 | | | |
| 18. Atmos. Temp. (°F/°C) | 32/0 | | 35/2 | | 38/3 | | 40/4 | | | |
| 19. Dew Point Temp. (°F/°C) | | | | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | 29.99 | | 29.98 | | 29.94 | | 29.89 | | | |
| 21. Relative Humidity (%) | 65 | | 45 | | 40 | | 37 | | | |
| 22. %S FROM $SO_2$ | 0.57 | | 0.59 | | 0.55 | | 0.58 | | | |
| 23. | | | | | | | | | | |
| 24. | | | | | | | | | | |
| 25. | | | | | | | | | | |
| 26. | | | | | | | | | | |
| 27. | | | | | | | | | | |
| 28. | | | | | | | | | | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA Test No.________

Test No.__________ Date 3-2-77 Location 19 Engr. BWH

Unit No.__________ Fuel N.G. Capacity 17500 #/hr

Unit Type______________________ Burner Type______________________

| | 19-171 | | 19-172 | | 19-173 | | 19-174 | | 19-175 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | | | | | | | | | | |
| 2. Date | 3-2-77 | | 3-2-77 | | 3-2-77 | | 3-2-77 | | 3-2-77 | |
| 3. Time | 1120 | | 1157 | | 1330 | | 1345 | | 1500 | |
| 4. Load | | | | | | | | | | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | 2.5 | | 2.5 | | 2.5 | | 2.5 | | 2.5 | |
| 7. Probe Position | CENTER | | CENTER | | CENTER | | CENTER | | CENTER | |
| 8. Oxygen (%) | 3.2 | | 3.05 | | 2.9 | | 3.1 | | 1.5 | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 20 | 20 | 85 | 85 | 29 | 29 | 46 | 46 | 36 | 33 |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 20 | 20 | 85 | 85 | 29 | 29 | 46 | 46 | 36 | 33 |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 24 | 24 | 102.5 | 102.7 | 35 | 35 | 56 | 56 | 46 | 42 |
| 13. Carbon Dioxide (%) | 10.6 | | 11.3 | | 10.8 | | 11.1 | | 11.3 | |
| 14. Carbon Monoxide (ppm) uncor/cor* | 20 | 20 | 22 | 22 | 12 | 12 | 14 | 14 | 96 | 89 |
| 15. Hydrocarbon (ppm) uncor/cor* | 3 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 |
| 16. Sulfur Dioxide (ppm) uncor/cor* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 17. Smoke Spot (Bacharach) | | | | | | | | | | |
| 18. Atmos. Temp. (°F/°C) | 34/1 | | 34/1 | | 44/6 | | 44/6 | | 45/7 | |
| 19. Dew Point Temp. (°F/°C) | | | | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | 30.27 | | 30.27 | | 30.23 | | 30.23 | | 30.22 | |
| 21. Relative Humidity (%) | 40 | | 40 | | 29 | | 29 | | 25 | |
| 22. | | | | | | | | | | |
| 23. | | | | | | | | | | |
| 24. | | | | | | | | | | |
| 25. | | | | | | | | | | |
| 26. | | | | | | | | | | |
| 27. | | | | | | | | | | |
| 28. | | | | | | | | | | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No.________ Date 3-2-77 Location 19 Engr. BWH

Unit No.________ Fuel N G Capacity 17500 #/hr

Unit Type________ Burner Type________

19-176 19-177

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1. Test No. | | | | | | | |
| 2. Date | 3-2-77 | | 3-2-77 | | | | |
| 3. Time | 1526 | | 1541 | | | | |
| 4. Load | | | | | | | |
| 5. Process Rate | | | | | | | |
| 6. Flue Diam. or Size, ft | 2.5 | | 2.5 | | | | |
| 7. Probe Position | CENTER | | CENTER | | | | |
| 8. Oxygen (%) | 3.75 | | 2.5 | | | | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 26 | 27 | 19 | 18 | | | |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 26 | 27 | 19 | 18 | | | |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 0 | 0 | 0 | 0 | | | |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 32 | 33 | 23 | 22 | | | |
| 13. Carbon Dioxide (%) | 10.0 | | 10.6 | | | | |
| 14. Carbon Monoxide (ppm) uncor/cor* | 14 | 15 | 16 | 16 | | | |
| 15. Hydrocarbon (ppm) uncor/cor* | 0 | 0 | 0 | 0 | | | |
| 16. Sulfur Dioxide (ppm) uncor/cor* | 0 | 0 | 0 | 0 | | | |
| 17. Smoke Spot (Bacharach) | | | | | | | |
| 18. Atmos. Temp. (°F/°C) | 45/7 | | 45/7 | | | | |
| 19. Dew Point Temp. (°F/°C) | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | 30.22 | | 30.22 | | | | |
| 21. Relative Humidity (%) | 25 | | 25 | | | | |
| 22. | | | | | | | |
| 23. | | | | | | | |
| 24. | | | | | | | |
| 25. | | | | | | | |
| 26. | | | | | | | |
| 27. | | | | | | | |
| 28. | | | | | | | |
| 29. | | | | | | | |
| 30. | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA Test No.

Test No. Date Location 19 Engr. BWH

Unit No. Fuel Capacity 17500 #/hr

Unit Type Burner Type

19-178 19-179

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | | | | | | | | | | |
| 2. Date | 3-3-77 | | 3-3-77 | | | | | | | |
| 3. Time | 0820 | | 1015 | | 1120 | | 1208 | | 1337 | |
| 4. Load | 14000 | | | | | | | | | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | 2.5 | | 2.5 | | 2.5 | | 2.5 | | 2.5 | |
| 7. Probe Position | CENTER | | CENTER | | CENTER | | CENTER | | CENTER | |
| 8. Oxygen (%) | 2.7 | | 3.6 | | 3.6 | | 3.5 | | 3.4 | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 98 | 96 | 27 | 28 | 28 | 29 | 28 | 29 | 26 | 27 |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 98 | 96 | 27 | 28 | 28 | 29 | 28 | 29 | 26 | 27 |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 113 | 111 | 32 | 33 | 32 | 33 | 32 | 33 | 30 | 31 |
| 13. Carbon Dioxide (%) | 13.2 | | 13.2 | | 13.0 | | 13.2 | | 13.2 | |
| 14. Carbon Monoxide (ppm) uncor/cor* | 10 | 10 | 18 | 19 | 16 | 17 | 18 | 19 | 18 | 18 |
| 15. Hydrocarbon (ppm) uncor/cor* | 6 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 16. Sulfur Dioxide (ppm) uncor/cor* | 60 | 59 | 80 | 83 | 90 | 93 | 80 | 82 | 80 | 82 |
| 17. Smoke Spot (Bacharach) | 0 | | 0 | | 0 | | — | | 0 | |
| 18. Atmos. Temp. (°F/°C) | 26/-3 | | 35/2 | | 40 | | 45/7 | | 48/9 | |
| 19. Dew Point Temp. (°F/°C) | | | | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | 30-36 | | 30.35 | | 30.34 | | 30.32 | | 30.30 | |
| 21. Relative Humidity (%) | 71 | | 54 | | 42 | | 34 | | 27 | |
| 22. % S IN FUEL FROM $SO_2$ | 0.10 | | 0.14 | | 0.16 | | 0.14 | | 0.14 | |
| 23. | | | | | | | | | | |
| 24. | | | | | | | | | | |
| 25. | | | | | | | | | | |
| 26. | | | | | | | | | | |
| 27. | | | | | | | | | | |
| 28. | | | | | | | | | | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.____

Test No.____ Date 3-3-77 Location 19 Engr. BWH

Unit No.____ Fuel #2 oil Capacity 17500 #/hr

Unit Type____ Burner Type____

5-19-179

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | | | | | | | | | | |
| 2. Date | 3-3-77 | | | | | | | | | |
| 3. Time | 1440 | | | | | | | | | |
| 4. Load | | | | | | | | | | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | 2.5 | | | | | | | | | |
| 7. Probe Position | CENTER | | | | | | | | | |
| 8. Oxygen (%) | 3.9 | | | | | | | | | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 27 | 28 | | | | | | | | |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 27 | 28 | | | | | | | | |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 0 | 0 | | | | | | | | |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 31 | 33 | | | | | | | | |
| 13. Carbon Dioxide (%) | 12.8 | | | | | | | | | |
| 14. Carbon Monoxide (ppm) uncor/cor* | 16 | 17 | | | | | | | | |
| 15. Hydrocarbon (ppm) uncor/cor* | 2 | 2 | | | | | | | | |
| 16. Sulfur Dioxide (ppm) uncor/cor* | 90 | 95 | | | | | | | | |
| 17. Smoke Spot (Bacharach) | — | | | | | | | | | |
| 18. Atmos. Temp. (°F/°C) | 50 | | | | | | | | | |
| 19. Dew Point Temp. (°F/°C) | | | | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | 30.27 | | | | | | | | | |
| 21. Relative Humidity (%) | 20 | | | | | | | | | |
| 22. % S | 0.16 | | | | | | | | | |
| 23. | | | | | | | | | | |
| 24. | | | | | | | | | | |
| 25. | | | | | | | | | | |
| 26. | | | | | | | | | | |
| 27. | | | | | | | | | | |
| 28. | | | | | | | | | | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA Test No.________

Test No.__________ Date__________ Location 19 Engr. BWH

Unit No.__________ Fuel N.G. Capacity 17500 #/hr

Unit Type__________ Burner Type__________

| | 19-180 | | 19-181 | | 19-182 | | 19-183 | | 19-184 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | ~~[illegible]~~ | | ~~[illegible]~~ | | ~~[illegible]~~ | | ~~[illegible]~~ | | ~~[illegible]~~ | |
| 2. Date | 3/4/77 | | 3/4/77 | | 3/4/77 | | 3/4/77 | | 3/4/77 | |
| 3. Time | 0800 | | 0923 | | 0934 | | 0952 | | 1002 | |
| 4. Load | | | | | | | | | | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | 2.5 | | 2.5 | | 2.5 | | 2.5 | | 2.5 | |
| 7. Probe Position | CENTER | | CENTER | | CENTER | | CENTER | | CENTER | |
| 8. Oxygen (%) | 6.2 | | 3.2 | | 6.15 | | 2.0 | | 1.1 | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 55 | 67 | 73 | 74 | 57 | 69 | 78 | 74 | 78 | 71 |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 55 | 67 | 73 | 74 | 57 | 69 | 78 | 74 | 78 | 71 |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 69 | 84 | 89 | 90 | 68 | 82 | 97 | 92 | 98 | 87 |
| 13. Carbon Dioxide (%) | 9.5 | | 11.0 | | 9.4 | | 11.8 | | 12.0 | |
| 14. Carbon Monoxide (ppm) uncor/cor* | 8 | 10 | 19 | 19 | 12 | 15 | 28 | 27 | 1100 | 995 |
| 15. Hydrocarbon (ppm) uncor/cor* | 16 | 19 | 4 | 4 | 1 | 1 | 2 | 2 | 0 | 0 |
| 16. Sulfur Dioxide (ppm) uncor/cor* | 40 | 49 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 17. Smoke Spot (Bacharach) | | | | | | | | | | |
| 18. Atmos. Temp. (°F/°C) | 43/6 | | 44/7 | | 44/7 | | 44/7 | | 44/7 | |
| 19. Dew Point Temp. (°F/°C) | | | | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | 30.09 | | 30.08 | | 30.08 | | 30.08 | | 30.05 | |
| 21. Relative Humidity (%) | 86 | | 86 | | 86 | | 86 | | 89 | |
| 22. % S | 0.08 | | 0 | | 0 | | 0 | | 0 | |
| 23. | | | | | | | | | | |
| 24. | | | | | | | | | | |
| 25. | | | | | | | | | | |
| 26. | | | | | | | | | | |
| 27. | | | | | | | | | | |
| 28. | | | | | | | | | | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.

Test No. Date Location 19 Engr. BWH

Unit No. Fuel N. G. Capacity 17500 #/hr

Unit Type Burner Type

| | 19-185 | | 19-186 | | 19-187 | | 19-188 | | 19-189 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | ~~19-181~~ | | [illegible] | | [illegible] | | [illegible] | | ~~19 185~~ | |
| 2. Date | 3/4/77 | | 3/4/77 | | 3/4/77 | | 3/4/77 | | 3/4/77 | |
| 3. Time | 1045 | | 1103 | | 1350 | | 1404 | | 1423 | |
| 4. Load | | | | | | | | | | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | 2.5 | | 2.5 | | 2.5 | | 2.5 | | 2.5 | |
| 7. Probe Position | CENTER | | CENTER | | CENTER | | CENTER | | CENTER | |
| 8. Oxygen (%) | 3.1 | | 2.8 | | 5.0 | | 4.8 | | 4.1 | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 44 | 44 | 40 | 40 | 16 | 18 | 16 | 18 | 22 | 23 |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 44 | 44 | 40 | 40 | 16 | 18 | 16 | 18 | 22 | 23 |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 56 | 56 | 50 | 49 | 19.5 | 22 | 20 | 22 | 27 | 29 |
| 13. Carbon Dioxide (%) | 11.3 | | 11.0 | | 9.7 | | 9.7 | | 10.2 | |
| 14. Carbon Monoxide (ppm) uncor/cor* | 60 | 60 | 296 | 293 | 12 | 14 | 12 | 13 | 60 | 64 |
| 15. Hydrocarbon (ppm) uncor/cor* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 16. Sulfur Dioxide (ppm) uncor/cor* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 17. Smoke Spot (Bacharach) | | | | | | | | | | |
| 18. Atmos. Temp. (°F/°C) | 44/7 | | 46/8 | | 48/9 | | 48/9 | | 48/9 | |
| 19. Dew Point Temp. (°F/°C) | | | | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | 30.05 | | 30.02 | | 29.87 | | 29.87 | | 28.87 | |
| 21. Relative Humidity (%) | 89 | | 89 | | 90 | | 90 | | 90 | |
| 22. % S | 0 | | 0 | | 0 | | 0 | | 0 | |
| 23. | | | | | | | | | | |
| 24. | | | | | | | | | | |
| 25. | | | | | | | | | | |
| 26. | | | | | | | | | | |
| 27. | | | | | | | | | | |
| 28. | | | | | | | | | | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.

Test No. Date 3/7/77 Location 19 Engr. BWH

Unit No. Fuel Capacity 17500 #/hr

Unit Type Burner Type

| | 19-190 | | | | 19-191 | | 19-192 | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | 19 | | | | | | | | | |
| 2. Date | 3/7/77 | | 3/7/77 | | 3/7/77 | | 3/7/77 | | 3/7/77 | |
| 3. Time | 0943 | | 1043 | | 1335 | | 1528 | | 1615 | |
| 4. Load | | | | | | | | | | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | 2.5 | | 2.5 | | 2.5 | | 2.5 | | 2.5 | |
| 7. Probe Position | CENTER | | CENTER | | CENTER | | CENTER | | CENTER | |
| 8. Oxygen (%) | 3.3 | | 3.2 | | 2.8 | | 4.2 | | 4.1 | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 21 | 21 | 21 | 21 | 183 | 181 | 138 | 149 | 138 | 147 |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 21 | 21 | 21 | 21 | 183 | 181 | 138 | 149 | 138 | 147 |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 26 | 26 | 26 | 26 | 203 | 201 | 153 | 164 | 155 | 165 |
| 13. Carbon Dioxide (%) | 9.9 | | 10.6 | | 12.1 | | 12.0 | | 13.2 | |
| 14. Carbon Monoxide (ppm) uncor/cor* | 18 | 18 | 14 | 14 | 28 | 28 | 16 | 17 | 16 | 17 |
| 15. Hydrocarbon (ppm) uncor/cor* | 0 | 0 | 0 | 0 | 2 | 2 | 1 | 1 | 0 | 0 |
| 16. Sulfur Dioxide (ppm) uncor/cor* | 20 | 20 | 20 | 20 | 340 | 336 | 300 | 321 | 320 | 341 |
| 17. Smoke Spot (Bacharach) | — | | — | | — | | 0 | | 1.5 | |
| 18. Atmos. Temp. (°F/°C) | 35/2 | | 35/2 | | 41/5 | | 42/6 | | 42/6 | |
| 19. Dew Point Temp. (°F/°C) | | | | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | 30.07 | | 30.07 | | 30.03 | | 30.01 | | 30.01 | |
| 21. Relative Humidity (%) | 72 | | 72 | | 47 | | 39 | | 39 | |
| 22. % S IN FUEL | 0.04 | | 0.04 | | 0.58 | | 0.55 | | 0.59 | |
| 23. | | | | | | | | | | |
| 24. | HI RECIRC<br>N.G. | | | | BASELINE<br>#6 OIL | | | | | |
| 25. | | | | | | | | | | |
| 26. | | | | | | | | | | |
| 27. | | | | | | | | | | |
| 28. | | | | | | | | | | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.

Test No. Date 3/8/77 Location 19 Engr. BWH

Unit No. Fuel NG Capacity 17500 #/hr

Unit Type Burner Type

← 19-193 →

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | ~~19-189~~ | | | | | | | | → | |
| 2. Date | 3/8/77 | | | | | | | | → | |
| 3. Time | 0925 | | 0930 | | 0935 | | 0940 | | 0945 | |
| 4. Load | | | | | | | | | | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | 2.5 | | → | | | | | | | |
| 7. Probe Position | 28" IN | | 23" IN | | 18" IN | | 13" IN | | 8" IN | |
| 8. Oxygen (%) | 3.25 | | 3.2 | | 3.2 | | 3.2 | | 3.2 | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 65 | 66 | 66 | 67 | 66 | 67 | 67 | 68 | 67 | 68 |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 65 | 66 | 66 | 67 | 66 | 67 | 67 | 68 | 67 | 68 |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 82 | 83 | 82 | 83 | 83 | 84 | 82 | 83 | 82 | 83 |
| 13. Carbon Dioxide (%) | 10.6 | | 10.6 | | 10.6 | | 10.6 | | 10.6 | |
| 14. Carbon Monoxide (ppm) uncor/cor* | 24 | 24 | 23 | 23 | 22 | 22 | 24 | 24 | 24 | 24 |
| 15. Hydrocarbon (ppm) uncor/cor* | 1 | 1 | 4 | 4 | 4 | 4 | 2 | 2 | 1 | 1 |
| 16. Sulfur Dioxide (ppm) uncor/cor* | — | — | 20 | 20 | 10 | 10 | 10 | 10 | 20 | 20 |
| 17. Smoke Spot (Bacharach) | — | | — | | — | | — | | — | |
| 18. Atmos. Temp. (°F/°C) | | | | | | | | | | |
| 19. Dew Point Temp. (°F/°C) | | | | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | | | | | | | | | | |
| 21. Relative Humidity (%) | | | | | | | | | | |
| 22. | | | | | | | | | | |
| 23. | | | | | | | | | | |
| 24. | | | | | | | | | | |
| 25. | | | | | | | | | | |
| 26. | | | | | | | | | | |
| 27. | | | | | | | | | | |
| 28. | | | | | | | | | | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

**MOBILE LABORATORY DATA**

Test No.

Test No. Date Location 19 Engr. BWH

Unit No. Fuel N. G. Capacity 17500 #/hr

Unit Type Burner Type

19-193 →

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | | | | | | | | | | |
| 2. Date | 3/8/77 | | 3/8/77 | | 3/8/77 | | 3/8/77 | | | |
| 3. Time | 0950 | | 1034 | | 1120 | | 1210 | | | |
| 4. Load | | | | | | | | | | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | 2.5 | | 2.5 | | 2.5 | | 2.5 | | | |
| 7. Probe Position | 3" IN | | CENTER | | CENTER | | CENTER | | | |
| 8. Oxygen (%) | 3.4 | | 3.3 | | 3.3 | | 3.3 | | | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | — | — | 63 | 64 | 64 | 65 | 65 | 66 | | |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 67 | 67 | 63 | 64 | 64 | 65 | 65 | 66 | | |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | — | — | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 82 | 83 | 80 | 81 | 80 | 81 | 81 | 82 | | |
| 13. Carbon Dioxide (%) | 10.4 | | 10.6 | | 10.4 | | 10.6 | | | |
| 14. Carbon Monoxide (ppm) uncor/cor* | 24 | 24 | 21 | 21 | 24 | 24 | 24 | 24 | | |
| 15. Hydrocarbon (ppm) uncor/cor* | 0 | 0 | 5 | 5 | 2 | 2 | 2 | 2 | | |
| 16. Sulfur Dioxide (ppm) uncor/cor* | 10 | 10 | 10 | 10 | 20 | 20 | 10 | 10 | | |
| 17. Smoke Spot (Bacharach) | | | | | | | | | | |
| 18. Atmos. Temp. (°F/°C) | | | 40/4 | | 43/6 | | 44/7 | | | |
| 19. Dew Point Temp. (°F/°C) | | | | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | | | 30.28 | | 30.27 | | 30.25 | | | |
| 21. Relative Humidity (%) | | | 50 | | 50 | | 40 | | | |
| 22. | | | | | | | | | | |
| 23. | | | | | | | | | | |
| 24. | | | | | | | | | | |
| 25. | | | | | | | | | | |
| 26. | | | | | | | | | | |
| 27. | | | | | | | | | | |
| 28. | | | | | | | | | | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No. 19-1-SASS Date 3-10-77 Location________ Engr. BWH

I t No.________ Fuel #6 0.1 Capacity 17500 #/hr

Unit Type________ Burner Type________

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | 19-1-SASS | | → | | → | | → | | → | |
| 2. Date | 3-10-77 | | → | | → | | → | | → | |
| 3. Time | 1120 | | 1200 | | 1300 | | 1406 | | 1500 | |
| 4. Load | 14200 | | | | | | | | | |
| 5. Process Rate | — | | — | | — | | — | | — | |
| 6. Flue Diam. or Size, ft | 2.5 | | 2.5 | | 2.5 | | 2.5 | | 2.5 | |
| 7. Probe Position | Center | | Center | | Center | | Center | | Center | |
| 8. Oxygen (%) | 2.8 | | 2.8 | | 3.1 | | 2.8 | | 2.8 | |
| 9. NOx (hot) read/3% $O_2$ (ppm) | 190 | 188 | 185 | 183 | 190 | 191 | 188 | 186 | 185 | 183 |
| 10. NO (hot) read/3% $O_2$ (ppm) | 190 | 188 | 185 | 183 | 190 | 191 | 188 | 186 | 185 | 183 |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12. NO (cold) read/3% $O_2$ (ppm) | 213 | 211 | 210 | 208 | 216 | 217 | 213 | 211 | 214 | 212 |
| 13. Carbon Dioxide (%) | 13.5 | | 14.0 | | 14.0 | | 14.0 | | 14.0 | |
| Carbon Monoxide (ppm) uncor/cor | 18 | 18 | 18 | 18 | 16 | 16 | 18 | 18 | 18 | 18 |
| 15. Hydrocarbon (ppm) uncor/cor | 0 | 0 | 3 | 3 | 1 | 1 | 1 | 1 | 0 | 0 |
| 16. Sulfur Dioxide (ppm) uncor/cor | 340 | 336 | 360 | 356 | 360 | 362 | 360 | 356 | 340 | 336 |
| 17. Smoke Spot (Bacharach) | — | | — | | — | | — | | — | |
| 18. Atmos. Temp. (°F/°C) | 56/13 | | 60/16 | | 70 | | 68 | | 68 | |
| 19. Dew Point Temp. (°F/°C) | | | | | 58 | | 53 | | 53 | |
| 20. Atmos. Pressure (in. Hg) | 30.21 | | 30.201 | | 30.2 | | 30.17 | | 30.17 | |
| 21. Relative Humidity (%) | 42 | | 33 | | 49 | | 35 | | 35 | |
| 22. % S in Fuel | 0.58 | | 0.61 | | 0.62 | | 0.61 | | 0.58 | |
| 23. | | | | | | | | | | |
| 24. | | | | | | | | | | |
| 25. | | | | | | | | | | |
| 26. | | | | | | | | | | |
| 27. | | | | | | | | | | |
| 28. | | | | | | | | | | |
| 29. | | | | | | | | | | |

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.

Test No. Date 3/10/77 Location Engr. KWH

I' 't No. Fuel #6 Oil Capacity 17500 #/h.

Unit Type Burner Type

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Test No. | 19-1-SPSS | | | | | |
| 2. Date | 3/10/77 | | | | | |
| 3. Time | 1600 | | | | | |
| 4. Load | | | | | | |
| 5. Process Rate | — | | | | | |
| 6. Flue Diam. or Size, ft | 2.5 | | | | | |
| 7. Probe Position | Center | | | | | |
| 8. Oxygen (%) | 3.1 | | | | | |
| 9. NOx (hot) read/3% $O_2$ (ppm) | 193 | 194 | | | | |
| 10. NO (hot) read/3% $O_2$ (ppm) | 193 | 194 | | | | |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm) | 0 | 0 | | | | |
| 12. NO (cold) read/3% $O_2$ (ppm) | 218 | 219 | | | | |
| 13. Carbon Dioxide (%) | 13.8 | | | | | |
| Carbon Monoxide (ppm) uncor/cor | 16 | 16 | | | | |
| 15. Hydrocarbon (ppm) uncor/cor | 1 | 1 | | | | |
| 16. Sulfur Dioxide (ppm) uncor/cor | 340 | 342 | | | | |
| 17. Smoke Spot (Bacharach) | 0 | | | | | |
| 18. Atmos. Temp. (°F/°C) | 69 | | | | | |
| 19. Dew Point Temp. (°F/°C) | 54 | | | | | |
| 20. Atmos. Pressure (in. Hg) | 30.17 | | | | | |
| 21. Relative Humidity (%) | 36 | | | | | |
| 22. % S in Fuel | 0.59 | | | | | |
| 23. | | | | | | |
| 24. | | | | | | |
| 25. | | | | | | |
| 26. | | | | | | |
| 27. | | | | | | |
| 28. | | | | | | |
| 29. | | | | | | |
| | | | | | | |

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No. 19-2-SASS Date 3/17/77 Location________ Engr. BWH

it No.________ Fuel #6 Oil Capacity 17500 #/hr steam

Unit Type________ Burner Type________

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | 19-2-SASS | | → | | | | | | | |
| 2. Date | 3/17/77 | | → | | | | | | | |
| 3. Time | 1000 | | 1100 | | 1200 | | 1300 | | 1400 | |
| 4. Load | 14000 | | 14500 | | 14800 | | 14900 | | | |
| 5. Process Rate | — | | — | | — | | — | | — | |
| 6. Flue Diam. or Size, ft | 2.5 | | → | | | | | | | |
| 7. Probe Position | Center | | → | | | | | | | |
| 8. Oxygen (%) | 3.2 | | 2.9 | | 2.8 | | 2.7 | | 3.0 | |
| 9. NOx (hot) read/3% $O_2$ (ppm) | 224 | 227 | 210 | 209 | 208 | 206 | 218 | 214 | 215 | 215 |
| 10. NO (hot) read/3% $O_2$ (ppm) | 221 | 224 | 210 | 209 | 208 | 205 | 218 | 214 | 215 | 215 |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm) | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12. NO (cold) read/3% $O_2$ (ppm) | 248 | 251 | 238 | 237 | 238 | 235 | 245 | 241 | 240 | 240 |
| 13. Carbon Dioxide (%) | 13.6 | | 14.0 | | 14.0 | | 14.0 | | 13.6 | |
| Carbon Monoxide (ppm) uncor/cor | 24 | 24 | 26 | 26 | 84 | 83 | 30 | 30 | 36 | 36 |
| 15. Hydrocarbon (ppm) uncor/cor | 0 | 0 | 6 | 6 | 5 | 5 | 3 | 3 | 2 | 2 |
| 16. Sulfur Dioxide (ppm) uncor/cor | 740 | 748 | 740 | 736 | 740 | 732 | 740 | 728 | 710 | 710 |
| 17. Smoke Spot (Bacharach) | 1 | | 0.5 | | | | | | | |
| 18. Atmos. Temp. (°F/°C) | 39 | | 41 | | 44 | | 46 | | 48 | |
| 19. Dew Point Temp. (°F/°C) | 35 | | 34 | | 38 | | 38 | | 38 | |
| 20. Atmos. Pressure (in. Hg) | 29.99 | | 29.99 | | 29.98 | | 29.97 | | 29.93 | |
| 21. Relative Humidity (%) | 67 | | 49 | | 57 | | 47 | | 38 | |
| 22. % S in Fuel | 1.29 | | 1.27 | | 1.26 | | 1.25 | | 1.22 | |
| 23. | | | | | | | | | | |
| 24. | | | | | | | | | | |
| 25. | BASELINE SASS | | | | | | | | | |
| 26. | | | | | | | | | | |
| 27. | | | | | | | | | | |
| 28. | | | | | | | | | | |
| 29. | | | | | | | | | | |

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No. 19-1· SASS Date 3/17/77 Location________ Engr. BWH

Unit No. 1 Fuel #6 Oil Capacity 17500 #/hr steam

Unit Type________ Burner Type________

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | 19-1· SASS | | | | | | | | | |
| 2. Date | 3/17/77 | | | | | | | | | |
| 3. Time | 1450 | | | | | | | | | |
| 4. Load | | | | | | | | | | |
| 5. Process Rate | — | | | | | | | | | |
| 6. Flue Diam. or Size, ft | 2.5 | | | | | | | | | |
| 7. Probe Position | Center | | | | | | | | | |
| 8. Oxygen (%) | 3.2 | | | | | | | | | |
| 9. NOx (hot) read/3% $O_2$ (ppm) | 219 | 221 | | | | | | | | |
| 10. NO (hot) read/3% $O_2$ (ppm) | 219 | 221 | | | | | | | | |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm) | 0 | 0 | | | | | | | | |
| 12. NO (cold) read/3% $O_2$ (ppm) | 255 | 258 | | | | | | | | |
| 13. Carbon Dioxide (%) | 13.6 | | | | | | | | | |
| Carbon Monoxide (ppm) uncor/cor | 24 | 24 | | | | | | | | |
| 15. Hydrocarbon (ppm) uncor/cor | 3 | 3 | | | | | | | | |
| 16. Sulfur Dioxide (ppm) uncor/cor | 730 | 738 | | | | | | | | |
| 17. Smoke Spot (Bacharach) | | | | | | | | | | |
| 18. Atmos. Temp. (°F/°C) | 50 | | | | | | | | | |
| 19. Dew Point Temp. (°F/°C) | 40 | | | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | 29.92 | | | | | | | | | |
| 21. Relative Humidity (%) | 40 | | | | | | | | | |
| 22. % S in Fuel | 1.27 | | | | | | | | | |
| 23. | | | | | | | | | | |
| 24. | BASELINE SASS | | | | | | | | | |
| 25. | | | | | | | | | | |
| 26. | | | | | | | | | | |
| 27. | | | | | | | | | | |
| 28. | | | | | | | | | | |
| 29. | | | | | | | | | | |

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No. 19-3-SASS Date 3/21/77 Location________ Engr. BWH

Unit No. 1 Fuel #6 Oil Capacity 17500 #/hr steam

Unit Type________ Burner Type________

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| ~~1.~~ Test No. | 19-3-SASS | | → | | | | | | | |
| 2. Date | 3-21-77 | | → | | | | | | | |
| 3. Time | 1035 | | 1130 | | 1235 | | 1330 | | 1430 | |
| 4. Load | | | | | | | | | | |
| 5. Process Rate | — | | — | | — | | — | | — | |
| 6. Flue Diam. or Size, ft | 2 5 | | → | | | | | | | |
| 7. Probe Position | Center | | → | | | | | | | |
| 8. Oxygen (%) | 1.7 | | 1.6 | | 2.0 | | 1.7 | | 1.8 | |
| 9. NOx (hot) read/3% $O_2$ (ppm) | 163 | 152 | 153 | 142 | 173 | 164 | 170 | 159 | 170 | 159 |
| 10. NO (hot) read/3% $O_2$ (ppm) | 163 | 152 | 153 | 142 | 173 | 164 | 170 | 159 | 170 | 159 |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12. NO (cold) read/3% $O_2$ (ppm) | 180 | 168 | 173 | 167 | 195 | 185 | 193 | 180 | 193 | 181 |
| 13. Carbon Dioxide (%) | 14.4 | | 14.4 | | 14.8 | | 14.4 | | 14.4 | |
| Carbon Monoxide (ppm) uncor/cor | 240 | 224 | 470 | 436 | 40 | 38 | 125 | 117 | 80 | 75 |
| 15. Hydrocarbon (ppm) uncor/cor | 3 | 3 | 5 | 5 | 0 | 0 | 3 | 3 | — | — |
| 16. Sulfur Dioxide (ppm) uncor/cor | 780 | 727 | 800 | 742 | 740 | 701 | 780 | 727 | 760 | 713 |
| 17. Smoke Spot (Bacharach) | 1.0 | | 1.0 | | 1.0 | | 1.0 | | 0.5 | |
| 18. Atmos. Temp. (°F/°C) | 42 | | 44 | | 45 | | 47 | | 51 | |
| 19. Dew Point Temp. (°F/°C) | 37 | | 39 | | 40 | | 42 | | 45 | |
| 20. Atmos. Pressure (in. Hg) | 30.25 | | 30.23 | | 30.20 | | 30.19 | | 30.14 | |
| 21. Relative Humidity (%) | 62 | | 64 | | 65 | | 67 | | 64 | |
| 22. % S in Fuel | 1.25 | | 1.28 | | 1.21 | | 1.25 | | 1.23 | |
| 23. | MAX RECIRC.<br>SASS<br>New #6 Oil + Burner Tip | | | | | | | | | |
| 24. | | | | | | | | | | |
| 25. | | | | | | | | | | |
| 26. | | | → | | | | | | | |
| 27. | | | | | | | | | | |
| 28. | | | | | | | | | | |
| 29. | | | | | | | | | | |

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.

Test No. Date 3·21·77 Location

Engr. BWH

Plant No. Fuel #6 Oil Capacity 17500 #/hr steam

Unit Type Burner Type

|  |  |  | Baseline |  |  |  |  |
|---|---|---|---|---|---|---|---|
| 1. Test No. | 19-3 SASS |  | 19-3 |  |  |  |  |
| 2. Date | 3-21-77 |  | 3·21·77 |  |  |  |  |
| 3. Time | 1530 |  | 1555 |  |  |  |  |
| 4. Load |  |  |  |  |  |  |  |
| 5. Process Rate | — |  | — |  |  |  |  |
| 6. Flue Diam. or Size, ft | 2.5 |  | 2.5 |  |  |  |  |
| 7. Probe Position | Center |  | Center |  |  |  |  |
| 8. Oxygen (%) | 1.2 |  | 2.85 |  |  |  |  |
| 9. NOx (hot) read/3% $O_2$ (ppm) | 168 | 158 | 237 | 234 |  |  |  |
| 10. NO (hot) read/3% $O_2$ (ppm) | 168 | 158 | 237 | 234 |  |  |  |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm) | 0 | 0 | 0 | 0 |  |  |  |
| 12. NO (cold) read/3% $O_2$ (ppm) | 193 | 181 | 273 | 270 |  |  |  |
| 13. Carbon Dioxide (%) | 14.4 |  | 13.8 |  |  |  |  |
| Carbon Monoxide (ppm) uncor/cor | 85 | 80 | 16 | 16 |  |  |  |
| 15. Hydrocarbon (ppm) uncor/cor | — | — | — | — |  |  |  |
| 16. Sulfur Dioxide (ppm) uncor/cor | 760 | 713 | 720 | 712 |  |  |  |
| 17. Smoke Spot (Bacharach) | 0.5 |  | 0.5 |  |  |  |  |
| 18. Atmos. Temp. (°F/°C) | 50 |  | 50 |  |  |  |  |
| 19. Dew Point Temp. (°F/°C) | 43 |  | 43 |  |  |  |  |
| 20. Atmos. Pressure (in. Hg) | 30.12 |  | 30.12 |  |  |  |  |
| 21. Relative Humidity (%) | 56 |  | 56 |  |  |  |  |
| 22. % S in Fuel | 1.23 |  | 1.23 |  |  |  |  |
| 23. | MAX. RECIRC.<br>SASS |  | BASELINE<br>NEW #6 Oil + BURNER TIP |  |  |  |  |
| 24. |  |  |  |  |  |  |  |
| 25. |  |  |  |  |  |  |  |
| 26. |  |  |  |  |  |  |  |
| 27. |  |  |  |  |  |  |  |
| 28. |  |  |  |  |  |  |  |
| 29. |  |  |  |  |  |  |  |

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.

Test No. Date 3-23-77 Location Engr. BWH

Unit No. 1 Fuel #6 Oil Capacity 17500 #/hr steam

Unit Type Burner Type Faber

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | 19.4 SASS | | → | | | | | | | |
| 2. Date | 3-23-77 | | → | | | | | | | |
| 3. Time | 0930 | | 1030 | | 1140 | | 1230 | | 1340 | |
| 4. Load | | | | | | | | | | |
| 5. Process Rate | — | | — | | — | | — | | | |
| 6. Flue Diam. or Size, ft | 2.5 | | → | | | | | | | |
| 7. Probe Position | Center | | → | | | | | | | |
| 8. Oxygen (%) | 1.5 | | 1.5 | | 1.3 | | 1.9 | | 1.5 | |
| 9. NOx (hot) read/3% $O_2$ (ppm) | 163 | 150 | 163 | 150 | 158 | 144 | 180 | 170 | 168 | 155 |
| 10. NO (hot) read/3% $O_2$ (ppm) | 163 | 150 | 163 | 150 | 158 | 144 | 180 | 170 | 165 | 152 |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 |
| 12. NO (cold) read/3% $O_2$ (ppm) | 188 | 174 | 188 | 174 | 172 | 163 | 208 | 196 | 193 | 178 |
| 13. Carbon Dioxide (%) | 14.4 | | 14.6 | | 14.4 | | 14.2 | | 14.4 | |
| Carbon Monoxide (ppm) uncor/cor | 128 | 118 | 120 | 111 | 238 | 208 | 28 | 26 | 104 | 96 |
| 15. Hydrocarbon (ppm) uncor/cor | — | — | — | — | — | — | — | — | — | — |
| 16. Sulfur Dioxide (ppm) uncor/cor | 710 | 655 | 710 | 655 | 680 | 621 | 720 | 679 | 700 | 646 |
| 17. Smoke Spot (Bacharach) | 0.5 | | 0.5 | | 0.5 | | — | | 0.5 | |
| 18. Atmos. Temp. (°F/°C) | 38 | | 40 | | 44 | | 46 | | 46 | |
| 19. Dew Point Temp. (°F/°C) | 33 | | 35 | | 38 | | 38 | | 37 | |
| 20. Atmos. Pressure (in. Hg) | 29.84 | | 29.83 | | 29.83 | | 29.83 | | 29.83 | |
| 21. Relative Humidity (%) | 59 | | 60 | | 58 | | 47 | | 41 | |
| 22. % S in Fuel | 1.13 | | 1.13 | | 1.07 | | 1.17 | | 1.11 | |
| 23. | | | | | | | | | | |
| 24. | | | | | | | | | | |
| 25. | | | | | | | | | | |
| 26. | MAX RECIRC.<br>MIN $O_2$<br>SASS | | | | | | | | | |
| 27. | | | | | | | | | | |
| 28. | | | | | | | | | | |
| 29. | | | | | | | | | | |
| . | | | | | | | | | | |

Data Sheet 6002-2

MOBILE LABORATORY DATA Test No.________

Test No.__________ Date 3-23-77 Location__________________ Engr. BWK

Unit No.__________ Fuel #6 Oil Capacity 17500 #/hr

Unit Type____________________ Burner Type____________________

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | BASELINE | | | | | | | |
| 1. Test No. | 19-4 SASS | | 19-4 | | | | | | | |
| 2. Date | 3-23-77 | | 3-23-77 | | | | | | | |
| 3. Time | 14:50 | | 15:05 | | | | | | | |
| 4. Load | | | | | | | | | | |
| 5. Process Rate | — | | — | | | | | | | |
| 6. Flue Diam. or Size, ft | 2.5 | | 2.5 | | | | | | | |
| 7. Probe Position | Center | | Center | | | | | | | |
| 8. Oxygen (%) - | 1.25 | | 2.8 | | | | | | | |
| 9. NOx (hot) read/3% $O_2$ (ppm) | 165 | 150 | 240 | 237 | | | | | | |
| 10. NO (hot) read/3% $O_2$ (ppm) | 165 | 150 | 240 | 237 | | | | | | |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm) | 0 | 0 | 0 | 0 | | | | | | |
| 12. NO (cold) read/3% $O_2$ (ppm) | 190 | 173 | 265 | 262 | | | | | | |
| 13. Carbon Dioxide (%) | 14.4 | | 13.8 | | | | | | | |
| Carbon Monoxide (ppm) uncor/cor | 112 | 102 | 22 | 22 | | | | | | |
| 15. Hydrocarbon (ppm) uncor/cor | — | — | — | — | | | | | | |
| 16. Sulfur Dioxide (ppm) uncor/cor | 700 | 638 | 640 | 633 | | | | | | |
| 17. Smoke Spot (Bacharach) | — | | | | | | | | | |
| 18. Atmos. Temp. (°F/°C) | 47 | | 47 | | | | | | | |
| 19. Dew Point Temp. (°F/°C) | 37 | | 37 | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | 29.83 | | 29.83 | | | | | | | |
| 21. Relative Humidity (%) | 37 | | 37 | | | | | | | |
| 22. % S in Fuel | 1.10 | | 1.09 | | | | | | | |
| 23. | | | | | | | | | | |
| 24. | | | | | | | | | | |
| 25. | MAX RECIRC.<br>MIN $O_2$<br>SASS | | BASELINE | | | | | | | |
| 26. | | | | | | | | | | |
| 27. | | | | | | | | | | |
| 28. | | | | | | | | | | |
| 29. | | | | | | | | | | |
| | | | | | | | | | | |

Data Sheet 6002-2

## UNIT OPERATING DATA

Test No. ____ Date JAN. 77 Location 19 Engr. SETTER

Fuel #2 OIL Atom.Type AIR Capacity 17500 LB/HR

Test Comments 30" I.D. STACK ¼" WALL

| | 19-2 | | 19-3 | | 19-4 | | 19-5 | | 19-6 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test Number | ~~19-3~~ | | ~~19-3~~ | | ~~19-3~~ | | ~~19-3~~ | | ~~19-3~~ | |
| 2. Date | 1/4/77 | | 1/5/77 | | 1/5/77 | | 1/6/77 | | 1/6/77 | |
| 3. Time | 15:15 | | 11:20 | | 15:00 | | 09:45 | | 10:45 | |
| 4. Load lb/hr | 14500 | | 14300 | | 14200 | | 14000 | | 14000 | |
| 5. Test Purpose | TEST SERIES 1 BASELINE | | #1 BASELINE $O_2$ TRAVERSE | | #1 BASELINE V TRAVERSE | | $SO_x$ METHODS #1 BASELINE | | → | |
| 6. Excess $O_2$ Condition | NOMINAL | | NOM | | NOM | | NOM | | NOM | |
| 7. Cont. Room $O_2$ (%) | — | | — | | — | | — | | — | |
| 8. Pres.Furn/Windbox(iwg) | 0.3 | 1.6 | 0.25 | 1.5 | 0.25 | 1.4 | 0.20 | 1.3 | 0.20 | 1.3 |
| 9. Uptake (iwg) | -0.24 | | -0.26 | | -0.28 | | -0.28 | | -0.28 | |
| 10. Final Stm Press (psig) | 160 | | 98 | | 97 | | 97 | | 98 | |
| 11. Drum Press (psig) | 100 | | 99 | | 97 | | 97 | | 98 | |
| 12. F. Water P/T (psig/°F) | 220 | 224 | 220 | 223 | 222 | 224 | 218 | 223 | 218 | 223 |
| 13. Air FD Fan Amps | — | | 8.2 | | 8.6 | | 8.4 | | 8.4 | |
| 14. Air Temp @ FD Fan/CR(°F) | — | | 75 | | 90 | | 77 | | 79 | |
| 15. Stack Temp (°F) | — | | 520 | | 514 | | 516 | | 515 | |
| 16. Fuel Flow (~~GPH or~~ GPM) | 2.18 | | 2.20 | | 2.15 | | 2.11 | | 2.14 | |
| 17. Fuel Pres/Temp(psi/°F) | 114 | 52 | 120 | 52 | 118 | 54 | 122 | 53 | 122 | 54 |
| 18. Fuel Atom Pres (psig) | 29 | | 29 | | 28 | | 28.5 | | 28.5 | |
| 19. Primary Reg. Setting | -8 | | -8 | | -8 | | -8 | | -8 | |
| 20. FGR Reg. Setting | — | | — | | — | | — | | — | |
| 21. ΔP Pitot FGR Duct(iwg) | 0 | | 0 | | 0 | | 0 | | 0 | |
| 22. ΔP Orif. FGR Duct(iwg) | 0 | | 0 | | 0 | | 0 | | 0 | |
| 23. Temp. FGR Duct (°F) | — | | — | | — | | — | | — | |
| 24. Pstat FGR Duct (psig) | — | | — | | — | | — | | — | |
| 25. Pstat S.A. Fan (psig) | — | | — | | — | | — | | — | |
| 26. Vortex FD Fan Blades | | | 40 | | 40 | | 40 | | 40 | |
| 27. Vortex SA Fan Blades | | | — | | — | | — | | — | |
| 28. SA Depth/Flow (ft/cfm) | — | — | — | — | — | — | — | — | — | — |
| 29. % FGR | — | | — | | — | | — | | — | |
| 30. Total Oil Burned #2/#6 | | | — | — | — | — | — | — | — | — |
| 31. Total Gas Burned | 0 | | 0 | | 0 | | 0 | | 0 | |
| STEAM VENT RATE (lb/hr) | 8000 | | 6000 | | 7000 | | 5700 | | 7000 | |
| TOTAL STEAM DUMPED | 7500 | | | | 35000 | | | | | |

Data Sheet 6003-16

## UNIT OPERATING DATA

Test No.

Date 6 JAN 77 Location 19 Engr. SCTTER

Fuel #2 OIL. Atom.Type AIR Capacity 17500 lb/hr

Test Comments

| | 19-7 | | 19-8 | | 19-9 | | 19-10 | | 19-11 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test Number | ~~19-3~~ | | ~~19-[illegible]~~ | | ~~1-9~~ | | ~~1-10~~ | | ~~2-1~~ | |
| 2. Date | 1/6/77 | | 1/6/77 | | 1/7/77 | | 1/10/77 | | 1/10/77 | |
| 3. Time | 15:30 | | 16:05 | | 10:15 | | 9:05 | | 9:50 | |
| 4. Load | 14000 | | 14000 | | 14000 | | 14200 | | 14300 | |
| 5. Test Purpose | BASELINE I IMPACTED | | → | | BASELINE I CHECK | | BASELINE I CHECK | | HIGH $O_2$ (ADJ BURNER FUEL CAL) | |
| 6. Excess $O_2$ Condition | NOM | | NOM | | NOM | | NOM | | HI | |
| 7. Cont. Room $O_2$ (%) | — | | — | | — | | 2.5 | | 4.3 | |
| 8. Pres.Furn/Windbox(iwg) | 0.25 | 1.3 | 0.25 | 1.3 | 0.25 | 1.4 | 0.32 | 1.8 | 0.60 | 2.4 |
| 9. Uptake (iwg) | -0.26 | | -0.26 | | -0.25 | | -0.24 | | -0.18 | |
| 10. Final Stm Press (psig) | 98 | | 98 | | 98 | | 98 | | 99 | |
| 11. Drum Press (psig) | 96 | | 97 | | 98 | | 100 | | 99 | |
| 12. F. Water P/T (psig/°F) | 223 | 225 | 221 | 225 | 221 | 225 | 218 | 226 | 218 | 226 |
| 13. Air FD Fan Amps | 8.6 | | 8.6 | | 8.6 | | 8.8 | | 9.5 | |
| 14. Air Temp @ FD Fan/CR(°F) | 88 | | 88 | | 89 | | 92 | | 94 | |
| 15. Stack Temp (°F) | 511 | | 511 | | 507 | | 513 | | 533 | |
| 16. Fuel Flow (~~GPH or~~ GPM) | 2.11 | | 2.14 | | 2.13 | | 2.22 | | 2.20 | |
| 17. Fuel Pres/Temp(psi/°F) | 120 | | 120 | 56 | 107 | 58 | 97 | 56 | 97 | 94 |
| 18. Fuel Atom Pres (psig) | 28 | | 28 | | 28 | | 28 | | 28 | |
| 19. Primary Reg. Setting | -8 | | -8 | | -8 | | -8 | | -8 | |
| 20. FGR Reg. Setting | — | | — | | — | | — | | — | |
| 21. ΔP Pitot FGR Duct(iwg) | 0 | | 0 | | 0 | | 0 | | 0 | |
| 22. ΔP Orif. FGR Duct(iwg) | 0 | | 0 | | 0 | | 0 | | 0 | |
| 23. Temp. FGR Duct (°F) | — | | — | | — | | — | | — | |
| 24. Pstat FGR Duct (psig) | — | | — | | — | | — | | — | |
| 25. Pstat S.A. Fan (psig) | — | | — | | — | | — | | — | |
| 26. F.D FAN ΔP ~~Vortex FD Fan Blades~~ | ~~40~~ | | ~~40~~ | | (1.18) | | 1.25 | | 1.75 | |
| 27. Vortex SA Fan Blades | — | | — | | — | | — | | — | |
| 28. SA Depth/Flow (ft/cfm) | — | — | — | — | — | — | — | — | — | — |
| 29. % FGR | — | | — | | — | | — | | — | |
| 30. Total Oil Burned #2/#6 | — | — | — | — | — | — | — | — | — | — |
| 31. Total Gas Burned | 0 | | 0 | | 0 | | 0 | | 0 | |
| STEAM VENT RATE (lb/hr) | 6000 | | 6000 | | 6500 | | 7000 | | 6500 | |
| ATOMIZING AIR PRESS.(PSIG) | | | | | 23.5 | | 23.9 | | 23.9 | |

Data Sheet 6003-16

## UNIT OPERATING DATA

Test No.______ Date______ Location 19 Engr. SOTTER

Fuel #2 OIL Atom.Type AIR Capacity 17500 lb/hr

Test Comments $O_2$ VAR

| | 19-12 | | 19-13 | | 19-14 | | 19-15 | | 19-16 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test Number | ~~2-2~~ | | ~~2-3~~ | | ~~4C-1~~ | | ~~1-11~~ | | ~~4A-11~~ | |
| 2. Date | 10 JAN | | 10 JAN | | 10 JAN | | 11 JAN | | 11 JAN | |
| 3. Time | 10:30 | | 10:50 | | 11:35 | | 9:30 | | 9:55 | |
| 4. Load | 14 300 | | 14,400 | | 14,200 | | 14 200 | | 14,500 | |
| 5. Test Purpose | OPT. $O_2$ | | BARELY VISIBLE SMOKE | | HI RECIRC | | BASELINE #1 | | 15% RECIRC | |
| 6. Excess $O_2$ Condition | OPT. | | MIN | | 3% | | 3% | | 3% | |
| 7. Cont. Room $O_2$ (%) | 0.2 | | 0 | | 2.1 | | 2.3 | | 2.4 | |
| 8. Pres.Furn/Windbox(iwg) | 0.30 | 1.4 | 0.30 | 1.4 | 0.90 | 3.7 | 0.29 | 1.6 | 0.55 | 2.8 |
| 9. Uptake (iwg) | -0.2 | | -0.20 | | -0.19 | | -0.22 | | -0.21 | |
| 10. Final Stm Press (psig) | 98 | | 98 | | 99 | | 98 | | 97 | |
| 11. Drum Press (psig) | 99 | | 100 | | 99 | | 98 | | 97 | |
| 12. F. Water P/T (psig/°F) | 218 | 226 | 215 | 226 | 215 | 224 | 218 | 224 | 218 | |
| 13. Air FD Fan Amps | 8.1 | | 8.1 | | 9.2 | | 8.5 | | 8.8 | |
| 14. Air Temp @ FD Fan/CR(°F) | 92 | | 93 | | 97 | | 78 | | 84 | |
| 15. Stack Temp (°F) | 499 | | 499 | | 560 | | 510 | | 548 | |
| 16. Fuel Flow (~~GPH or~~ GPM) | 2.14 | | 2.17 | | 2.20 | | 2.23 | | 2.18 | |
| 17. Fuel Pres/Temp(psi/°F) | 107 | 56 | 107 | 56 | 122 | 58 | 122 | 40 | 122 | 40 |
| 18. Fuel Atom Pres (psig) | 28.6 | | 28.9 | | 29.0 | | 28.8 | | 28.9 | |
| 19. Primary Reg. Setting | -8 | | -8 | | -8 | | -8 | | -8 | |
| 20. FGR Reg. Setting IN FROM FACE | — | — | — | — | 1.0 | | 4.25 | CLOSED | 3.3 | |
| 21. ΔP Pitot FGR Duct(iwg) | — | | — | | — | | 0.00 | | 0.07 | |
| 22. ΔP Orif. FGR Duct(iwg) | — | | — | | 0.70 | | 0.00 | | 0.20 | |
| 23. Temp. FGR Duct (°F) | — | | 113 | | 520 | | 105 | | 476 | |
| 24. Pstat FGR Duct (psig) | — | | — | | — | | 0.46 | | 5.5 | |
| 25. Pstat S.A. Fan (psig) | — | | — | | — | | — | | — | |
| 26. ~~Vortex FD Fan Blades~~ F.D. FAN INLET ΔP, IWG | 0.95 | | 0.94 | | 1.4 | | 1.1 | | 1.2 | |
| 27. Vortex SA Fan Blades | — | | — | | — | | — | | — | |
| 28. SA Depth/Flow (ft/cfm) | — | — | — | — | — | — | — | — | — | — |
| 29. % FGR | — | | — | | — | | — | | — | |
| 30. Total Oil Burned #2/#6 | — | — | — | — | — | — | — | — | — | — |
| 31. Total Gas Burned | 0 | | 0 | | 0 | | 0 | | 0 | |
| STEAM VENT, lb/hr | 7000 | | 7000 | | 7000 | | 5500 | | 5300 | |
| ATOM. AIR PRESS, PSIG | 23.8 | | 23.8 | | 23.9 | | 23.8 | | 23.9 | |

Data Sheet 6003-16

## UNIT OPERATING DATA

Test No.______ Date______ Location 19 Engr. SOTTER

Fuel #2 OIL Atom.Type AIR Capacity 17500 lb/hr

Test Comments ______

| | 19-17 | | 19-18 | | 19-19 | | 19-20 | | 19-21 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test Number | ~~46-2~~ | | ~~48-1~~ | | ~~48-2~~ | | ~~4A-2~~ | | ~~46-2~~ | |
| 2. Date | 11 JAN | | 11 JAN | | 11 JAN | | 11 JAN | | 11 JAN | |
| 3. Time | 10:50 | | 12:00 | | 12:20 | | 12:50 | | 1:30 | |
| 4. Load | 14400 | | 14400 | | 14400 | | 14500 | | 14500 | |
| 5. Test Purpose | MAX. RECIRC | | MID RECIRC | | MID RECIRC<br>LOW $O_2$ | | LOW RECIRC<br>LOW $O_2$ | | HI RECIRC | |
| 6. Excess $O_2$ Condition | 3% | | 3% | | LOW | | LOW | | LOW | |
| 7. Cont. Room $O_2$ (%) | 1.9 | | 2.5 | | 0.6 | | 0.4 | | 0.75 | |
| 8. Pres.Furn/Windbox(iwg) | 0.78 | 3.5 | 0.72 | 3.2 | 0.55 | 2.7 | 0.50 | 2.5 | 0.72 | 3.2 |
| 9. Uptake (iwg) | -0.20 | | -0.16 | | -0.22 | | -0.22 | | -0.21 | |
| 10. Final Stm Press (psig) | 98 | | 99 | | 98 | | 98 | | 99 | |
| 11. Drum Press (psig) | 99 | | 99 | | 100 | | 98 | | 99 | |
| 12. F. Water P/T (psig/°F) | 218 | 225 | 218 | 226 | 220 | 226 | 220 | 226 | 218 | 225 |
| 13. Air FD Fan Amps | 8.9 | | 9.0 | | 8.5 | | 8.4 | | 8.5 | |
| 14. Air Temp @ FD Fan/CR(°F) | 89 | | 92 | | 92 | | 94 | | 95 | |
| 15. Stack Temp (°F) | 560 | | 557 | | 548 | | 541 | | 552 | |
| 16. Fuel Flow (~~CPM or~~ GPM) | 2.21 | | 2.16 | | 2.26 | | 2.20 | | 2.18 | |
| 17. Fuel Pres/Temp(psi/°F) | 123 | 40 | 123 | 43 | 123 | 45 | 123 | 45 | 123 | 45 |
| 18. Fuel Atom Pres (psig) | 29.0 | | 29.2 | | 29.2 | | 29.2 | | 29.1 | |
| 19. Primary Reg. Setting | -8 | | -8 | | -8 | | -8 | | -8 | |
| 20. FGR Reg. Setting IN | 0.7 | | 2.8 | | 3.0 | | 3.3 | | 0.7 | (MAX) |
| 21. ΔP Pitot FGR Duct(iwg) | 0.145 | | 0.11 | | 0.095 | | 0.05 | | 0.15 | |
| 22. ΔP Orif. FGR Duct(iwg) | 0.75 | | 0.40 | | 0.36 | | 0.19 | | 0.80 | |
| 23. Temp. FGR Duct (°F) | 515 | | 510 | | 510 | | 510 | | 518 | |
| 24. Pstat FGR Duct (~~psig~~ iwg) | 4.3 | | 4.6 | | ~4.4 | | ~4.8 | | 2.4 | |
| 25. Pstat S.A. Fan (~~psig~~) | — | | — | | — | | — | | — | |
| 26. Vortex FD Fan ~~Blades~~ ΔP | 1.2 | | 1.2 | | 1.0 | | 1.0 | | 1.0 | |
| 27. Vortex SA Fan Blades | — | | — | | — | | — | | — | |
| 28. SA Depth/Flow (ft/cfm) | — | — | — | — | — | — | — | — | — | — |
| 29. % FGR | — | | — | | — | | — | | — | |
| 30. Total Oil Burned #2/#6 | — | — | — | — | — | — | — | — | — | — |
| 31. Total Gas Burned | 0 | | 0 | | 0 | | 0 | | 0 | |
| STEAM VENT RATE, lb/hr | 5500 | | 5500 | | 5500 | | 5500 | | 5600 | |

Data Sheet 6003-16

## UNIT OPERATING DATA

Test No. ____ Date ____ Location 19 Engr. G. SOTTEF

Fuel #2 OIL Atom.Type AIR Capacity 17,500 lb/hr

Test Comments ____

| | 19-22 | | 19-23 | | 19-24 | | 19-25 | | 19-26 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test Number | ~~1-12~~ | | ~~3-0a~~ | | ~~3-0b~~ | | ~~3-0c~~ | | 3-0d | |
| 2. Date | 12 JAN 76 | | 12 JAN 76 | | 12 JAN 76 | | 12 JAN 76 | | 12 JAN 76 | |
| 3. Time | 7:45 | | 8:45 | | 9:00 | | 9:10 | | 9:30 | |
| 4. Load | 14,000 | | 14,000 | | 14,000 | | 14,300 | | 14,000 | |
| 5. Test Purpose | BASELINE CHECK | | 2° AIR CALIBRATION | | → | | → | | → | |
| 6. Excess O$_2$ Condition | NOM | | HI | | HI | | HI | | HI | |
| 7. Cont. Room O$_2$ (%) | 3.3 | | 6.5 | | 5.5 | | 5.0 | | 7.0 | |
| 8. Pres.Furn/Windbox(iwg) | 0.20 | 1.6 | 0.5 | 1.7 | 0.45 | 1.7 | 0.40 | 1.7 | 0.55 | 1.75 |
| 9. Uptake (iwg) | -0.26 | | -0.20 | | -0.20 | | -0.22 | | -0.20 | |
| 10. Final Stm Press (psig) | 97 | | 97 | | 97 | | 94 | | 98 | |
| 11. Drum Press (psig) | 98 | | 98 | | 99 | | 99 | | 99 | |
| 12. F. Water P/T (psig/°F) | 220 | 224 | 212 | 224 | 215 | 224 | 205 | 224 | 218 | 230 |
| 13. Air FD Fan Amps | 8.5 | | 8.4 | | 8.4 | | 8.4 | | 8.4 | |
| 14. Air Temp @ FD Fan/CR (°F) | 72 | | 80 | | 80 | | 81 | | 81 | |
| 15. Stack Temp (°F) | 505 | | 527 | | 525 | | 522 | | 528 | |
| 16. Fuel Flow (~~CFM~~ or GPM) | 2.20 | | 2.15 | | 2.16 | | 2.18 | | 2.19 | |
| 17. Fuel Pres/Temp (psi/°F) | 115 | 47 | 115 | 47 | 115 | 47 | 115 | 47 | 115 | 47 |
| 18. Fuel Atom Pres (psig) | 29 | | 29 | | 30 | | 30 | | 30 | |
| 19. Primary Reg. Setting | -8 | | -8 | | -8 | | -8 | | -8 | |
| 20. FGR Reg. Setting | C | (CLOSED) | C | | C | | C | | C | |
| 21. ΔP Pitot FGR Duct (iwg) | — | | — | | — | | — | | — | |
| 22. ΔP Orif. FGR Duct (iwg) | — | | 0.0 | | -0.01 | | -0.01 | | — | |
| 23. Temp. FGR Duct (°F) | — | | 95 | | 95 | | 98 | | 98 | |
| 24. Pstat FGR Duct (psig) | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 | |
| 25. Pstat S.A. LEVEL ~~Fan~~ IWG ~~(psig)~~ | 0 | | 4.2 | | 3.0 | | 2.0 | | 5.4 MAX | |
| 26. Vortex FD Fan ΔP, IWG ~~Blades~~ | 1.1 | | 1.1 | | 1.1 | | 1.1 | | 1.1 | |
| 27. Vortex SA Fan OUTLET STATIC ΔP IWG ~~Blades~~ | — | | — | | — | | 11.0 | | 10.5 | |
| 28. SA Depth/Flow (ft/cfm) | + | | 5 | | 5 | | 5 | | 5 | |
| 29. % FGR | 0 | | 0 | | 0 | | 0 | | 0 | |
| 30. Total Oil Burned #2/#6 | + | | + | | + | | + | | + | |
| 31. Total Gas Burned | 0 | | 0 | | 0 | | 0 | | 0 | |
| STEAM VENT RATE, LB/HR | 5500 | | 5500 | | 5000 | | 6000 | | 5500 | |
| ATOMIZING AIR PRESS, PSIG | 24.1 | | 24.1 | | 24.1 | | 24.1 | | 24.1 | |

Data Sheet 6003-16

## UNIT OPERATING DATA

Test No.______ Date______ Location 19 Engr. SOTTER

Fuel #2 DIESEL Atom.Type AIR Capacity 17,500 LB

Test Comments ______

| | 19-27 | | 19-28 | | 19-29 | | 19-30 | | 19-31 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test Number | 3-0e | | ~~3Ala~~ | | ~~3Bla~~ | | ~~3Cla~~ | | 3Dla | |
| 2. Date | 12 JAN 77 | | 12 JAN 77 | | 12 JAN 77 | | 12 JAN 77 | | 12 JAN 77 | |
| 3. Time | 9:45 | | 12:30 | | 12:45 | | 1:00 | | 1:10 | |
| 4. Load | 14,000 | | 14,000 | | 14,500 | | 14,500 | | 14,500 | |
| 5. Test Purpose | 2° AIR CAL PROBE FULL IN | | TSC 4' Φ=1.2 | | TSC 5' | | TSC 6' | | 6' 11" | |
| 6. Excess O2 Condition | HI | | NOM | | NOM | | NOM | | NOM | |
| 7. Cont. Room O2 (%) | 6.7 | | 2.8 | | 2.8 | | 2.8 | | 2.7 | |
| 8. Pres.Furn/Windbox(iwg) | 0.57 | 1.8 | 0.30 | 1.2 | 0.28 | 1.2 | 0.28 | 1.2 | 0.3 | 1.2 |
| 9. Uptake (iwg) | -0.20 | | -0.20 | | -0.22 | | -0.22 | | -0.22 | |
| 10. Final Stm Press (psig) | 98 | | 98 | | 96 | | 97 | | 97 | |
| 11. Drum Press (psig) | 100 | | 98 | | 97 | | 98 | | 97 | |
| 12. F. Water P/T (psig/°F) | 205 | | 223 | 224 | 221 | 224 | 220 | 224 | 220 | 224 |
| 13. Air FD Fan Amps | 8.5 | | 8.0 | | 8.0 | | 7.9 | | 7.9 | |
| 14. Air Temp @ FD Fan/CR(°F) | 82 | | 82 | | 84 | | 82 | | 82 | |
| 15. Stack Temp (°F) | 526 | | 496 | | 495 | | 493 | | 492 | |
| 16. Fuel Flow (CFM or GPM) | 2.17 | | 2.13 | | 2.11 | | 2.12 | | 2.10 | |
| 17. Fuel Pres/Temp(psi/°F) | 115 | | 115 | 48 | 115 | 48 | 115 | 48 | 115 | 48 |
| 18. Fuel Atom Pres (psig) | — | | 28 | | 28 | | 28 | | 28 | |
| 19. Primary Reg. Setting | -8 | | -8 | | -8 | | -8 | | -8 | |
| 20. FGR Reg. Setting | C | | C | | C | | C | | C | |
| 21. ΔP Pitot FGR Duct(iwg) | — | | — | | — | | — | | — | |
| 22. ΔP Orif. FGR Duct(iwg) | — | | -0.15 | | — | | — | | — | |
| 23. Temp. FGR Duct (°F) | — | | 105 | | — | | — | | — | |
| 24. Pstat FGR Duct (psig) | — | | 0.0 | | — | | — | | — | |
| 25. Pstat S.A. LANCE, IWG ~~Fan (psig)~~ | 5.6 | | 2.9 | | 3.0 | | 3.2 | | 3.4 | |
| 26. Vortex FD Fan ΔP ~~Blades~~ | 1.1 | | 0.68 | | 0.68 | | 0.68 | | 0.68 | |
| 27. Vortex SA Fan P STATIC ~~Blades~~ | 10.5 | | 10.9 | | 10.9 | | 10.9 | | 10.9 | |
| 28. SA Depth/Flow (ft/cfm) | | FULL IN | 4.0 | | 5.0 | | 6.0 | | 6'11" | |
| 29. % FGR | 0 | | 0 | | 0 | | 0 | | 0 | |
| 30. Total Oil Burned #2/#6 | — | — | — | — | — | — | — | — | — | — |
| 31. Total Gas Burned | 0 | | 0 | | 0 | | 0 | | 0 | |
| STEAM VENT RATE, LB/HR | — | | 5000 | | 5500 | | 5500 | | 5300 | |
| ATOMIZING AIR PRESS, PSIG | — | | 24.0 | | 23.9 | | 24.0 | | 23.9 | |

Data Sheet 6003-16

## UNIT OPERATING DATA

Test No.________ Date________ Location 19 Engr. SCTTER

Fuel #2 OIL Atom.Type AIR Capacity 17,500 LB/HR

Test Comments________

| | 19-32 | | 19-33 | | 19-34 | | 19-35 | | 19-36 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test Number | 3D1B | | ~~3C1B~~ | | ~~3C1b~~ | | ~~3A1b~~ | | 3D2a | |
| 2. Date | 12 JAN 77 | | 12 JAN 77 | | → | | → | | → | |
| 3. Time | 1:30 | | 1:45 | | 1:55 | | 2:10 | | 2:40 | |
| 4. Load | 14,400 | | 14,300 | | 14 200 | | 14,200 | | 14,200 | |
| 5. Test Purpose | TSC 7'<br>φ = 1.3 | | TSC 6'<br>φ = 1.3 | | TSC 5'<br>φ = 1.3 | | TSC 4'<br>φ = 1.3 | | TSC 7'<br>φ = 1.2 | |
| 6. Excess $O_2$ Condition | NOM | | NOM | | NOM | | NOM | | LO | |
| 7. Cont. Room $O_2$ (%) | 2.7 | | 2.7 | | 2.7 | | 2.8 | | 1.5 | |
| 8. Pres.Furn/Windbox(iwg) | 0.28 | 1.0 | 0.28 | 1.0 | 0.30 | 1.0 | 0.30 | 1.0 | 0.22 | 1.2 |
| 9. Uptake (iwg) | -0.20 | | -0.21 | | -0.20 | | -0.20 | | -0.22 | |
| 10. Final Stm Press (psig) | 97 | | 97 | | 97 | | 98 | | 98 | |
| 11. Drum Press (psig) | 97 | | 98 | | 100 | | 98 | | 98 | |
| 12. F. Water P/T (psig/°F) | 220 | 224 | 218 | 224 | 216 | 224 | 219 | 225 | 219 | |
| 13. Air FD Fan Amps | 7.6 | | 7.6 | | 7.6 | | 7.6 | | 8.1 | |
| 14. Air Temp @ FD Fan/CR (°F) | 83 | | 85 | | 84 | | 85 | | 82 | |
| 15. Stack Temp (°F) | 483 | | 488 | | 490 | | 492 | | 498 | |
| 16. Fuel Flow (CFM or GPM) | 2.14 | | 2.11 | | 2.15 | | 2.14 | | 2.12 | |
| 17. Fuel Pres/Temp (psi/°F) | 115 | 48 | 115 | 49 | 115 | 48 | 115 | 49 | 115 | 49 |
| 18. Fuel Atom Pres (psig) | 28 | | 28 | | 28 | | 28 | | 28 | |
| 19. Primary Reg. Setting | -8 | | -8 | | -8 | | -8 | | -8 | |
| 20. FGR Reg. Setting | C | | C | | C | | C | | C | |
| 21. ΔP Pitot FGR Duct (iwg) | — | | — | | — | | — | | 0.0 | |
| 22. ΔP Orif. FGR Duct (iwg) | — | | — | | — | | — | | -0.02 | |
| 23. Temp. FGR Duct (°F) | — | | — | | — | | — | | 107 | |
| 24. Pstat FGR Duct (psig) | — | | 0.0 | | — | | — | | — | |
| 25. Pstat S.A. ~~Fan (psig)~~ LANCE SWG | 5.6 | | 5.4 | | 5.2 | | 4.9 | | 0.8 | |
| 26. Vortex FD Fan ~~Blades~~ ΔP | 0.56 | | 0.56 | | 0.56 | | 0.56 | | 0.79 | |
| 27. Vortex SA Fan ~~Blades~~ Ps | 10.5 | | 10.5 | | 10.5 | | 10.4 | | 10.9 | |
| 28. SA Depth/Flow (ft/cfm) | 6'11" | | 6' | | 5' | | 4' | | 6'11" | |
| 29. % FGR | 0 | | 0 | | 0 | | 0 | | 0 | |
| 30. Total Oil Burned #2/#6 | + | | + | | + | | + | | + | |
| 31. Total Gas Burned | 0 | | 0 | | 0 | | 0 | | 0 | |
| S. VENT LB/HR | 5500 | | 5500 | | 5500 | | 5500 | | 5600 | |
| AT. AIR PRESS. | 24.0 | | 24.0 | | 24.0 | | 24.0 | | 24.0 | |

Data Sheet 6003-16

## UNIT OPERATING DATA

Test No.______ Date______ Location 19______ Engr.______

Fuel #2 or #6 OIL Atom.Type AIR Capacity 17 500 LB/HR

Test Comments ______

| | 19-37 | | NO. 2 ←<br>19-38 | | → NO. 6<br>19-39 | | 19-40 | | 19-41 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test Number | 3C2a | | ~~1-13~~ | | ~~11-1~~ | | ~~12-1~~ | | 12-2 | |
| 2. Date | 12 JAN 77 | | 13 JAN 77 | | 14 JAN 77 | | 14 JAN 77 | | 14 JAN 77 | |
| 3. Time | 2:50 | | 8:45 | | 11:15 | | 2:45 | | 15:25 | |
| 4. Load | 14,250 | | 14,000 | | 14 100 | | 14,200 | | 14,000 | |
| 5. Test Purpose | TSC 6<br>$\phi$ = 1.2 | | BASELINE<br>#2 OIL | | BASELINE<br>#6 OIL | | MED $O_2$ | | HI $O_2$ | |
| 6. Excess $O_2$ Condition | LO | | NOM | | NOM | | NOM | | HI | |
| 7. Cont. Room $O_2$ (%) | 1.7 | | — | | 3.4 | | 3.6 | | 5.0 | |
| 8. Pres.Furn/Windbox(iwg) | 0.25 | 1.2 | 0.20 | 1.2 | 0.25 | 1.6 | 0.35 | 1.8 | 0.48 | 2.1 |
| 9. Uptake (iwg) | −0.20 | | −0.24 | | −0.22 | | −0.22 | | −0.22 | |
| 10. Final Stm Press (psig) | 97 | | 98 | | 97 | | 97 | | 98 | |
| 11. Drum Press (psig) | 100 | | 98 | | 97 | | 97 | | 98 | |
| 12. F. Water P/T (psig/°F) | 220 | 226 | 215 | 226 | 219 | 226 | 224 | 226 | 225 | 224 |
| 13. Air FD Fan Amps | 8.0 | | 8.5 | | 8.4 | | 8.8 | | 9.4 | |
| 14. Air Temp @ FD Fan/CR(°F) | 84 | | 76 | | 80 | | 91 | | 90 | |
| 15. Stack Temp (°F) | 498 | | 499 | | 500 | | 500 | | 512 | |
| 16. Fuel Flow (~~CFM or~~ GPM) | 2.16 | | 2.14 | | 2.22 | | 2.19 | | 2.13 | |
| 17. Fuel Pres/Temp(psi/°F) | 115 | 48 | 119 | 50 | 128 | 194 | 125 | 194 | 119 | 193 |
| 18. Fuel Atom Pres (psig) | 28 | | 28 | | 33 | | 33 | | 33 | |
| 19. Primary Reg. Setting | -8 | | -8 | | -8 | | -8 | | -8 | |
| 20. FGR Reg. Setting | C | | C | | C | | C | | C | |
| 21. ΔP Pitot FGR Duct(iwg) | — | | — | | −0.05 | | — | | — | |
| 22. ΔP Orif. FGR Duct(iwg) | — | | — | | −0.01 | | — | | — | |
| 23. Temp. FGR Duct (°F) | — | | 95 | | 110 | | — | | — | |
| 24. Pstat FGR Duct (psig) | — | | +0.4 | | — | | — | | — | |
| 25. Pstat S.A. Fan ~~(psig)~~ | 10.9 | | 0 | | 0 | | 0 | | — | |
| 26. Vortex FD Fan ~~Blades~~ ΔP, IWG | 0.79 | | 1.1 | | 1.1 | | 1.2 | | 1.4 | |
| 27. Vortex SA Fan ~~Blades~~ P's | — | | 0 | | 0 | | 0 | | 0 | |
| 28. SA Depth/Flow (ft/cfm) | 6' | | + | | + | | + | | + | |
| 29. % FGR | 0 | | 0 | | 0 | | 0 | | 0 | |
| 30. Total Oil Burned #2/#6 | + | | + | | + | | + | | + | |
| 31. Total Gas Burned | 0 | | 0 | | 0 | | 0 | | 0 | |
| ST. VENT LB/HR | 5600 | | 5500 | | 5300 | | 6000 | | 5900 | |
| AT AIR PRESS, PSIG | 24.0 | | 24.2 | | 26.9 | | 26.8 | | 26.5 | |

Data Sheet 6003-16

## UNIT OPERATING DATA

Test No.________ Date________ Location 19 Engr.________

Fuel #6 OIL Atom.Type AIR Capacity 17,500 LB/HR

Test Comments

| | 19-42 | | 19-43 | | 19-44 | | 19-45 | | 19-46 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test Number | ~~12-3~~ | | ~~12-4~~ | | ~~11-2~~ | | ~~14A-1~~ | | 14A-1a | |
| 2. Date | 14 JAN 77 | | 14 JAN 77 | | 15 JAN 77 | | 15 JAN 77 | | 15 JAN 77 | |
| 3. Time | 15:50 | | 16:30 | | 08:15 | | 09:10 | | 9:45 | |
| 4. Load | 14,400 | | 14,500 | | 14,200 | | 14,300 | | 14 300 | |
| 5. Test Purpose | CO | | SMOKE | | BASELINE PT. 11 | | LO RECIRC | | REPEAT PREV AS CHECK | |
| 6. Excess $O_2$ Condition | LO | | LOW | | NOM | | NOM | | NOM | |
| 7. Cont. Room $O_2$ (%) | 0.80 | | 0.70 | | — | | — | | — | |
| 8. Pres.Furn/Windbox(iwg) | 0.25 | 1.55 | 0.20 | 1.65 | 0.40 | 1.70 | 0.70 | 3.0 | 0.70 | 3.0 |
| 9. Uptake (iwg) | -0.22 | | -0.21 | | -0.21 | | -0.20 | | -0.20 | |
| 10. Final Stm Press (psig) | 100 | | 100 | | 99 | | 97 | | 97 | |
| 11. Drum Press (psig) | 98 | | 98 | | 105 | | 99 | | 99 | |
| 12. F. Water P/T (psig/°F) | 222 | 226 | 225 | 226 | 218 | LOW WATER | 218 | 214 | 218 | 218 |
| 13. Air FD Fan Amps | 8.6 | | 8.5 | | 8.8 | | 9.1 | | 9.2 | |
| 14. Air Temp @ FD Fan/CR(°F) | 90 | | 88 | | 90 | | 95 | | 97 | |
| 15. Stack Temp (°F) | 491 | | 492 | | 540 | | 563 | | 563 | |
| 16. Fuel Flow (~~CPM or~~ GPM) | 2.21 | | 2.22 | | 2.27 | | 2.30 | | 2.27 | |
| 17. Fuel Pres/Temp(psi/°F) | 128 | 194 | 129 | 194 | 120 | | 195 | 196 | 120 | |
| 18. Fuel Atom Pres (psig) | 34 | | 34 | | 33 | | 33 | | 33 | |
| 19. Primary Reg. Setting | -8 | | +6 | | -8 | | -8 | | -8 | |
| 20. FGR Reg. Setting | C | | C | | C | | C | | C | |
| 21. ΔP Pitot FGR Duct(iwg) | — | | — | | 0.0 | | +0.20 | | +0.10 | |
| 22. ΔP Orif. FGR Duct(iwg) | — | | — | | -0.02 | | +0.20 | | 0.195 | |
| 23. Temp. FGR Duct (°F) | — | | — | | 115 | | 508 | | 511 | |
| 24. Pstat FGR Duct (psig) | — | | — | | 0.05 | | 5.4 | | 5.4 | |
| 25. Pstat S.A. Fan (psig) | — | | — | | — | | — | | — | |
| 26. Vortex FD Fan ~~Blades~~ ΔP | 0.89 | | 0.86 | | 1.25 | | 1.30 | | 1.30 | |
| 27. Vortex SA Fan Blades | — | | — | | — | | — | | — | |
| 28. SA Depth/Flow (ft/cfm) | — | | — | | — | | — | | — | |
| 29. % FGR | 0 | | 0 | | 0 | | 0 | | 0 | |
| 30. Total Oil Burned #2/#6 | — | | — | | — | | — | | — | |
| 31. Total Gas Burned | 0 | | 0 | | 0 | | 0 | | 0 | |
| STEAM VENT, LB/HR | 5800 | | 6500 | | 5800 | | 4500 | | 4500 | |
| ATOM AIR PRESS, PSIG | 26.9 | | 27.0 | | 26.5 | | 26.9 | | 26.9 | |
| DIFFUSER POS. | 3" | | 3" | | 3" | | 3 | | 3 | |

Data Sheet 6003-16

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UNIT OPERATING DATA

Test No.________ Date________ Location 19 Engr. SCTTEL

Fuel #6 OIL . Atom.Type AIR Capacity 17 560

Test Comments

| | 19-47 | | 19-48 | | 19-49 | | 19-50 | | 19-51 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test Number | 14B-1 | | [illegible] | | [illegible] | | [illegible] | | 14A-2 | |
| 2. Date | 15 JAN 77 | | 15 JAN 77 | | 15 JAN 77 | | 15 JAN 77 | | 15 JAN 77 | |
| 3. Time | 10:20 | | 10:45 | | 11:10 | | 11:30 | | 11:45 | |
| 4. Load | 14,300 | | 14,300 | | 14 500 | | 14 560 | | 14 400 | |
| 5. Test Purpose | MED RECIRC | | HI RECIRC | | HI RECIRC WITH CO | | MED. REC. WITH CO | | LO RECIRC WITH CO | |
| 6. Excess $O_2$ Condition | NOM | | NOM | | LO | | LO | | LO | |
| 7. Cont. Room $O_2$ (%) | | | | | | | | | | |
| 8. Pres.Furn/Windbox(iwg) | 0.8 | 3.3 | 0.9 | 3.3 | 0.75 | 3.3 | 0.62 | 2.8 | 0.5 | |
| 9. Uptake (iwg) | -0.20 | | -0.20 | | -0.20 | | -0.22 | | -0.22 | |
| 10. Final Stm Press (psig) | 98 | | 99 | | 99 | | 99 | | 98 | |
| 11. Drum Press (psig) | 100 | | 100 | | 99 | | 99 | | 100 | |
| 12. F. Water P/T (psig/°F) | 217 | 224 | 217 | | 220 | 224 | 218 | 224 | 215 | 224 |
| 13. Air FD Fan Amps | 9.2 | | 9.4 | | 8.8 | | 8.8 | | 8.9 | |
| 14. Air Temp @ FD Fan/CR (°F) | 97 | | 97 | | 98 | | 97 | | 99 | |
| 15. Stack Temp (°F) | 568 | | 571 | | 562 | | 557 | | 550 | |
| 16. Fuel Flow (~~CFM~~or GPM) | 2.24 | | 2.26 | | 2.31 | | 2.26 | | 2.30 | |
| 17. Fuel Pres/Temp (psi/°F) | 120 | 196 | 121 | 196 | 120 | 196 | 121 | 196 | 120 | 196 |
| 18. Fuel Atom Pres (psig) | 33 | | 33 | | 33 | | 33 | | 33 | |
| 19. Primary Reg. Setting | -8 | | -8 | | -8 | | -8 | | -8 | |
| 20. FGR Reg. Setting FACE TO HANDLE, IN. | 2 7/8 | | 3/4 | MAX | 3/4 | MAX | 3 | | 3 | |
| 21. ΔP Pitot FGR Duct (iwg) | 0.1 | | 0.2 - 0.6 RAPID | | 0.1 | | 0.07 | | 0.03 | |
| 22. ΔP Orif. FGR Duct (iwg) | 0.40 | | 0.74 | | 0.82 | | 0.36 | | 0.18 | |
| 23. Temp. FGR Duct (°F) | 547 | | 540 | | 535 | | 515 | | 500 | |
| 24. Pstat FGR Duct ~~(psig)~~ | 5.0 | | 4.5 | | 4.4 | | 5.1 | | 5.5 | |
| 25. Pstat S.A. Fan (psig) | — | | — | | | | — | | — | |
| 26. Vortex FD Fan Blades | — | | 1.4 | | 1.05 | | 1.05 | | 1.03 | |
| 27. Vortex SA Fan Blades | — | | — | | — | | — | | — | |
| 28. SA Depth/Flow (ft/cfm) | + | | + | | + | | + | | + | |
| 29. % FGR | 0 | | 0 | | 0 | | 0 | | 0 | |
| 30. Total Oil Burned #2/#6 | + | | + | | + | | + | | + | |
| 31. Total Gas Burned | 0 | | 0 | | 0 | | 0 | | 0 | |
| STEAM VENT RATE, LB/HR | 6000 | | 6100 | | 7000 | | 6500 | | 6100 | |
| ATOM. AIR PRESS, PSIG | 26.9 | | 26.9 | | 27.0 | | 27.0 | | 27.0 | |
| DIFFUSER POS. | 3" | | 3" | | 3" | | 3 | | 3 | |

Data Sheet 6003-16

## UNIT OPERATING DATA

Test No. ________ Date ________ Location 19 Engr. SOTTER

Fuel #2 Atom.Type AIR Capacity 17,500 LB/HR

Test Comments ________

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 19-52 | | 19-53 | | 19-54 | | 19-55 | | 19-56 | |
| 1. Test Number | ~~0-2~~ | | ~~1-14~~ | | ~~54la~~ | | ~~55la~~ | | ~~56la~~ | |
| 2. Date | 17 JAN 77 | | 17 JAN 77 | | 17 JAN 77 | | 17 JAN 77 | | 17 JAN 77 | |
| 3. Time | 11:30 | | 14:10 | | 15:00 | | 15:15 | | 15:30 | |
| 4. Load | 10,000 | | 14,500 | | 14,200 | | 14,200 | | 14,200 | |
| 5. Test Purpose | EXTRA - FOR LOW AIR FLOW | | #2 BASELINE | | #2 Φ=1.2 LOW RECIRC | | ——— | | ———→ | |
| 6. Excess $O_2$ Condition | NOM | | NOM | | NOM | | NOM | | NOM | |
| 7. Cont. Room $O_2$ (%) | 4.2 | | 3.8 | | 3.0 | | 3.0 | | 2.8 | |
| 8. Pres.Furn/Windbox(iwg) | 0.0 | 1.0 | 0.32 | 1.7 | 0.50 | 2.2 | 0.50 | 2.2 | 0.50 | 2.3 |
| 9. Uptake (iwg) | -0.25 | | -0.23 | | -0.23 | | -0.23 | | -0.23 | |
| 10. Final Stm Press (psig) | 100 | | 99 | | 99 | | 99 | | 99 | |
| 11. Drum Press (psig) | 99 | | 93 | | 98 | | 100 | | 95 | |
| 12. F. Water P/T (psig/°F) | 225 | 220 | 223 | 222 | 223 | 222 | 223 | 222 | 223 | 222 |
| 13. Air FD Fan Amps | 7.4 | | 8.1 | | 7.6 | | 7.6 | | 7.8 | |
| 14. Air Temp @ FD Fan/CR(°F) | 77 | | 76 | | 85 | | 84 | | 84 | |
| 15. Stack Temp (°F) | 481 | | 518 | | 551 | | 550 | | 550 | |
| 16. Fuel Flow (CFM or GPM) | 1.76 | | 2.07 | | 2.09 | | 2.07 | | 2.15 | |
| 17. Fuel Pres/Temp (psi/°F) | 114 | 52 | 113 | 52 | 114 | 54 | 114 | 54 | 114 | 54 |
| 18. Fuel Atom Pres (psig) | 23 | | 28 | | 28 | | 28 | | 28 | |
| 19. Primary Reg. Setting | -8 | | -8 | | -8 | | -8 | | -8 | |
| 20. FGR Reg. Setting | C | | C | | 3.4 | | 3.4 | | 3.4 | |
| 21. ΔP Pitot FGR Duct(iwg) | — | | — | | 0.115 | | 0.115 | | 0.113 | |
| 22. ΔP Orif. FGR Duct(iwg) | — | | — | | 0.20 | | 0.19 | | 0.19 | |
| 23. Temp. FGR Duct (°F) | 93 | | 97 | | 500 | | 500 | | 500 | |
| 24. Pstat FGR Duct (psig) | +0.25 | | 0.0 | | 5.3 | | 5.3 | | 5.3 | |
| 25. Pstat S.A. Fan (psig) | — | | — | | 2.9 | | 3.1 | | 3.3 | |
| 26. Vortex FD Fan Blades | 0.77 | | 1.22 | | 0.68 | | 0.68 | | 0.68 | |
| 27. Vortex SA Fan Blades | — | | — | | 10.6 | | 10.6 | | 10.6 | |
| 28. SA Depth/Flow (ft/cfm) | — | — | — | — | 4 | | 6 | | 6'11" | |
| 29. % FGR | 0 | | 0 | | | | | | | |
| 30. Total Oil Burned #2/#6 | — | — | — | — | — | — | — | — | — | — |
| 31. Total Gas Burned | 0 | | 0 | | 0 | | 0 | | 0 | |

| | | | | | |
|---|---|---|---|---|---|
| STEAM VENT RATE, LB/HR | | 5300 | 4900 | 4900 | 4900 |
| ATOM AIR PRESS, PSIG | 21.0 | 24.0 | 24.0 | 24.0 | 24.0 |

Data Sheet 6003-16

## UNIT OPERATING DATA

Test No.______ Date______ Location 19 Engr.______

Fuel #2 OIL Atom.Type AIR Capacity 17,500 LB/HR

Test Comments $P_{STAT}$ ON FGR DUCT FLUCTUATES ± ½ IN.

| | 19-57 | | 19-58 | | 19-59 | | 19-60 | | 19-61 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test Number | ~~5I1a~~ | | ~~5F1a~~ | | ~~5C1A~~ | | ~~5J1a~~ | | ~~5A2b~~ | |
| 2. Date | 17 JAN 77 | | 17 JAN 77 | | 17 JAN 77 | | 17 JAN 77 | | 18 JAN 77 | |
| 3. Time | 15:55 | | 16:05 | | 16:15 | | 16:30 | | 10:15 | |
| 4. Load | 14,000 | | 14,200 | | 14,100 | | 14,500 | | 14,000 | |
| 5. Test Purpose | MAX RECIRC<br>$\phi=1.2$ | | → | | → | | LOW RECIRC (12%) | | 13% FGR<br>$\phi=1.35$ | |
| 6. Excess $O_2$ Condition | NOM | | NOM | | NOM | | NOM | | LO (CO) | |
| 7. Cont. Room $O_2$ (%) | 3.0 | | 2.8 | | 3.0 | | 3.0 | | 1.5 | |
| 8. Pres.Furn/Windbox(iwg) | 0.80 | 3.0 | 0.79 | 3.0 | 0.79 | 3.0 | 0.55 | 2.3 | 0.50 | 2.2 |
| 9. Uptake (iwg) | -0.20 | | -0.20 | | -0.21 | | -0.22 | | -0.22 | |
| 10. Final Stm Press (psig) | 99 | | 99 | | 100 | | 100 | | 95 | |
| 11. Drum Press (psig) | 97 | | 97 | | 98 | | 98 | | 96 | |
| 12. F. Water P/T (psig/°F) | 223 | 222 | 223 | 222 | 224 | 224 | 224 | 224 | 210 | 222 |
| 13. Air FD Fan Amps | 8.0 | | 8.0 | | 8.0 | | 7.9 | | 8.0 | |
| 14. Air Temp @ FD Fan/CR(°F) | 83 | | 84 | | 86 | | 87 | | 82 | |
| 15. Stack Temp (°F) | 563 | | 563 | | 568 | | 555 | | 541 | |
| 16. Fuel Flow (~~CPM or~~ GPM) | 2.09 | | 2.15 | | 2.10 | | 2.17 | | 2.22 | |
| 17. Fuel Pres/Temp(psi/°F) | 114 | 54 | 114 | 55 | 114 | 54 | 114 | 54 | 116 | 54 |
| 18. Fuel Atom Pres (psig) | 28 | | 28 | | 28 | | 28 | | 29 | |
| 19. Primary Reg. Setting | -8 | | -8 | | -8 | | -8 | | -8 | |
| 20. FGR Reg. Setting | MAX | | MAX | | MAX | | 3.4 | | 3.4 | |
| 21. ΔP Pitot FGR Duct(iwg) | 0.24 | | 0.24 | | 0.24 | | 0.110 | | 0.09 | |
| 22. ΔP Orif. FGR Duct(iwg) | 0.78 | | 0.78 | | 0.78 | | 0.17 | | 0.18 | |
| 23. Temp. FGR Duct (°F) | 535 | | 535 | | 540 | | 505 | | 485 | |
| 24. Pstat FGR Duct (psig) | 4.0 | | 3.9 | | 3.4 | | 4.4 | | 4.3 | |
| 25. Pstat S.A. Fan ~~(psig)~~ | 3.4 | | 3.3 | | 3.1 | | 2.9 | | 2.7 | |
| 26. Vortex FD Fan Blades | 0.76 | | 0.76 | | 0.76 | | 0.71 | | 0.70 | |
| 27. Vortex SA Fan ~~Blades~~ ΔP | 10.6 | | 10.6 | | 10.6 | | 10.6 | | 10.8 | |
| 28. SA Depth/Flow (ft/cfm) | 6'11" | | 6' | | 4' | | 4' | | 4' | |
| 29. % FGR | | | | | | | | | | |
| 30. Total Oil Burned #2/#6 | + | | + | | + | | + | | + | |
| 31. Total Gas Burned | 0 | | 0 | | 0 | | 0 | | 0 | |
| | 4900 | | 5000 | | 5000 | | 4900 | | 6000 | |
| | 24.0 | | 24.0 | | 24.0 | | 24.0 | | 24.9 | |

Data Sheet 6003-16

## UNIT OPERATING DATA

Test No.________ Date________ Location 19 Engr. SOTTER

Fuel #2 OIL Atom. Type AIR (LOW-PRESS) Capacity 17,500 LB/HR

Test Comments

| | 19-62 | | 19-63 | | 19-64 | | 19-65 | | 19-66 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test Number | ~~562b~~ | | ~~512b~~ | | ~~562b~~ | | ~~562c~~ | | ~~512c~~ | |
| 2. Date | 18 JAN 77 | | → | | → | | → | | → | |
| 3. Time | 10:35 | | 10:55 | | 11:10 | | 11:30 | | 11:45 | |
| 4. Load | 14,000 | | 14,100 | | 14,100 | | 14,500 | | | |
| 5. Test Purpose | 15% FGR<br>φ=1.35 | | MAX FGR<br>φ=1.35 | | → | | MAX FGR<br>φ=1.5 | | MAX FGR<br>φ=1.5 | |
| 6. Excess $O_2$ Condition | LO (CO) | | LO (CO) | | LO (CO) | | LO (CO) | | LO (CO) | |
| 7. Cont. Room $O_2$ (%) | 1.4 | | 1.7 | | 1.5 | | 1.9 | | 1.9 | |
| 8. Pres.Furn/Windbox (iwg) | 0.50 | 2.2 | 0.78 | 3.0 | 0.80 | 3.0 | 0.80 | 3.0 | 0.80 | 3.0 |
| 9. Uptake (iwg) | −0.22 | | −0.21 | | −0.21 | | −0.21 | | −0.20 | |
| 10. Final Stm Press (psig) | 94 | | 94 | | 94 | | 94 | | 94 | |
| 11. Drum Press (psig) | 95 | | 95 | | 95 | | 95 | | 94 | |
| 12. F. Water P/T (psig/°F) | 212 | 222 | 210 | 222 | 210 | 222 | 215 | 222 | 215 | 222 |
| 13. Air FD Fan Amps | 8.0 | | 8.4 | | 8.4 | | 8.0 | | 8.3 | |
| 14. Air Temp @ FD Fan/CR (°F) | 82 | | 82 | | 85 | | 89 | | 87 | |
| 15. Stack Temp (°F) | 542 | | 559 | | 560 | | 560 | | 560 | |
| 16. Fuel Flow (CFM or GPM) | 2.29 | | 2.21 | | 2.29 | | 2.19 | | 2.21 | |
| 17. Fuel Pres/Temp (psi/°F) | 116 | 54 | 116 | 55 | 116 | 54 | 116 | 55 | 117 | 55 |
| 18. Fuel Atom Pres (psig) | 29 | | 29 | | 29 | | 29 | | 29 | |
| 19. Primary Reg. Setting | −8 | | −8 | | −8 | | −8 | | −8 | |
| 20. FGR Reg. Setting | 3.4 | | MAX | | MAX | | MAX | | MAX | |
| 21. ΔP Pitot FGR Duct (iwg) | 0.09 | | 0.20 | | 0.20 | | 0.20 | | 0.20 | |
| 22. ΔP Orif. FGR Duct (iwg) | 0.18 | | 0.79 | | 0.79 | | 0.80 | | 0.80 | |
| 23. Temp. FGR Duct (°F) | 490 | | 529 | | 532 | | 533 | | 535 | |
| 24. Pstat FGR Duct (psig) | 3.9 | | 4.2 | | 4.2 | | 4.2 | | 4.3 | |
| 25. Pstat S.A. Fan (psig) | 3.2 | | 3.2 | | 2.9 | | 4.6 | | 5.1 | |
| 26. Vortex FD Fan ~~Blades~~ ΔP | 0.69 | | 0.79 | | 0.79 | | 0.66 | | 0.66 | |
| 27. Vortex SA Fan Blades | 10.8 | | 10.75 | | 10.7 | | 10.4 | | 10.4 | |
| 28. SA Depth/Flow (ft/cfm) | 7' | | 7' | | 4' | | 4' | | 7' | |
| 29. % FGR | | | | | | | | | | |
| 30. Total Oil Burned #2/#6 | | | | | | | | | | |
| 31. Total Gas Burned | 0 | | 0 | | 0 | | 0 | | 0 | |
| | 6300 | | 5700 | | 5700 | | 5700 | | 5700 | |
| | 24.9 | | 24.9 | | 25.0 | | 25.0 | | | |

Data Sheet 6003-16

## UNIT OPERATING DATA

Test No.______ Date______ Location 19 Engr. SETTER

Fuel #2 + #6, Atom.Type AIR Capacity 17 500 LB/HR

Test Comments ______

| | #2 OIL | | #6 OIL → | | |
|---|---|---|---|---|---|
| | 19-69 | 19-68 | 19-69 | 19-70 | 19-71 |
| 1. Test Number | ~~'62C~~ | ~~542C~~ | ~~11-3~~ | ~~1321b~~ | ~~1381b~~ |
| 2. Date | 18 JAN 77 | → | → | → | → |
| 3. Time | 12:05 | 12:20 | 14:05 | 15:30 | 15:55 |
| 4. Load | 14,500 | 14,600 | 14 500 | 14 500 | 14,500 |
| 5. Test Purpose | 15% RECIRC. $\phi$=1.5 | → | #6 BASELINE | #6 STAGED $\phi$=1.3 | → |
| 6. Excess $O_2$ Condition | LO (CO) | LO | NOM | NOM | NOM |
| 7. Cont. Room $O_2$ (%) | 1.7 | 1.7 | 2.4 | 3.0 | 2.9 |
| 8. Pres.Furn/Windbox(iwg) | 0.60 2.3 | 0.60 2.3 | 0.48 1.9 | 0.5 1.4 | 0.48 1.4 |
| 9. Uptake (iwg) | -0.21 | -0.21 | -0.18 | -0.18 | -0.18 |
| 10. Final Stm Press (psig) | 94 | 94 | 95 | 96 | 97 |
| 11. Drum Press (psig) | 94 | 94 | 97 | 97 | 97 |
| 12. F. Water P/T (psig/°F) | 214 222 | 215 222 | 216 220 | 214 222 | 215 222 |
| 13. Air FD Fan Amps | 8.4 | 8.4 | 9.0 | 8.5 | 8.5 |
| 14. Air Temp @ FD Fan/CR (°F) | 89 | 91 | 87 | 96 | 96 |
| 15. Stack Temp (°F) | 548 | 550 | 515 | 510 | 515 |
| 16. Fuel Flow (CFM or GPM) | 2.22 | 2.21 | 2.29 | 2.27 | 2.29 |
| 17. Fuel Pres/Temp (psi/°F) | 117 56 | 117 56 | 133 194 | 133 196 | 134 196 |
| 18. Fuel Atom Pres (psig) | 30 | 30 | 34 | 34 | 34 |
| 19. Primary Reg. Setting | -8 | -8 | -8 | -8 | -8 |
| 20. FGR Reg. Setting | 3.4 | 3.4 | C | C | C |
| 21. ΔP Pitot FGR Duct (iwg) | 0.10 | 0.098 | — | — | — |
| 22. ΔP Orif. FGR Duct (iwg) | 0.18 | 0.18 | — | — | — |
| 23. Temp. FGR Duct (°F) | 500 | 500 | — | 135 | — |
| 24. Pstat FGR Duct (psig) | 5.4 | 5.4 | — | — | — |
| 25. Pstat S.A. Fan (psig) | 4.2 | 4.0 | — | 5.0 | 5.4 |
| 26. Vortex FD Fan Blades | 0.65 | — | 1.3 | 0.68 | |
| 27. Vortex SA Fan Blades | 10.5 | 10.5 | — | 10.1 | 10.1 |
| 28. SA Depth/Flow (ft/cfm) | 7' | 4' | — | 4' | 5' |
| 29. % FGR | | | 0 | 0 | 0 |
| 30. Total Oil Burned #2/#6 | — | — | — | — | — |
| 31. Total Gas Burned | 0 | 0 | 0 | 0 | 0 |
| STEAM VENT RATE, LB/HR | 5500 | 5800 | 6000 | 5700 | 6500 |
| ATOM. AIR PRESS., PSIG | 25.0 | 25.0 | 27.1 | 27.1 | 27.1 |

Data Sheet 6003-16

## UNIT OPERATING DATA

Test No.________ Date________ Location 19 Engr. SOTTER

Fuel #6 + #2 Atom.Type AIR Capacity 17,500

Test Comments ________

| | #6 OIL<br>19-72 | | #2 OIL →<br>19-73 | | 19-74 | | 19-75 | | 19-76 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test Number | ~~3C1b~~ | | ~~1-15~~ | | ~~2-2F~~ | | ~~2-2P~~ | | 2-2 I | |
| 2. Date | 18 JAN 77 | | 19 JAN 77 | | → | | → | | → | |
| 3. Time | 16:05 | | 9:10 | | 11:00 | | 12:20 | | 14:40 | |
| 4. Load | 14,000 | | 14500 | | 14,300 | | 14,300 | | 14,300 | |
| 5. Test Purpose | #6 OIL<br>Φ=1.3 | | #2<br>BASELINE | | LOW $O_2$<br>PARTIC. | | → | | LOW $O_2$<br>IMPACTOR | |
| 6. Excess $O_2$ Condition | NOM | | NOM | | LO | | → | | → | |
| 7. Cont. Room $O_2$ (%) | 3.0 | | 3.0 | | 1.0 | | 1.0 | | 1.1 | |
| 8. Pres.Furn/Windbox(iwg) | 0.48 | 2.0 | 0.38 | 1.7 | 0.28 | 1.4 | 0.30 | 1.4 | 0.35 | 1.5 |
| 9. Uptake (iwg) | 0.198 | | -0.20 | | -0.22 | | -0.22 | | -0.22 | |
| 10. Final Stm Press (psig) | 97 | | 98 | | 96 | | 97 | | 97 | |
| 11. Drum Press (psig) | 97 | | 100 | | 98 | | 97 | | 97 | |
| 12. F. Water P/T (psig/°F) | 215 | 222 | 208 | 222 | 210 | 224 | 215 | 222 | 217 | 222 |
| 13. Air FD Fan Amps | 8.5 | | 8.7 | | 8.3 | | 8.7 | | 8.6 | |
| 14. Air Temp @ FD Fan/CR(°F) | 91 | | 74 | | 80 | | 84 | | 88 | |
| 15. Stack Temp (°F) | 520 | | 515 | | 510 | | 513 | | 521 | |
| 16. Fuel Flow (~~CPM or~~ GPM) | 2.26 | | 2.22 | | 2.22 | | 2.23 | | 2.25 | |
| 17. Fuel Pres/Temp(psi/°F) | 134 | 196 | 117 | 54 | 119 | 45 | 119 | 45 | 120 | 48 |
| 18. Fuel Atom Pres (psig) | 34 | | 29 | | 29 | | 29 | | 29 | |
| 19. Primary Reg. Setting | +5 | | -8 | | -8 | | -8 | | -8 | |
| 20. FGR Reg. Setting | — | | C | | C | | C | | C | |
| 21. ΔP Pitot FGR Duct(iwg) | — | | — | | — | | — | | — | |
| 22. ΔP Orif. FGR Duct(iwg) | — | | — | | — | | — | | — | |
| 23. Temp. FGR Duct (°F) | — | | 100 | | — | | — | | — | |
| 24. Pstat FGR Duct (psig) | — | | — | | — | | — | | — | |
| 25. Pstat S.A. Fan (psig) | 5.4 | | — | | — | | — | | — | |
| 26. Vortex FD Fan Blades | 0.71 | | 1.28 | | 0.99 | | 1.05 | | 1.03 | |
| 27. Vortex SA Fan Blades | 10.1 | | — | | — | | — | | — | |
| 28. SA Depth/Flow (ft/cfm) | 6' | | — | — | — | — | — | — | — | — |
| 29. % FGR | 0 | | 0 | | 0 | | 0 | | 0 | |
| 30. Total Oil Burned #2/#6 | — | — | — | — | — | — | — | — | — | — |
| 31. Total Gas Burned | 0 | | 0 | | 0 | | 0 | | 0 | |
| STEAM VENT RATE, LB/HR | 5800 | | 6000 | | 5700 | | 6500 | | 7100 | |
| ATOM. AIR PRESS., PSIG | 27.1 | | 24.5 | | 24.1 | | 24.1 | | | |
| DIFFUSER POS., IN. | 4.25 | | 3.0 | | 3.0 | | 3.0 | | | |

Data Sheet 6003-16

## UNIT OPERATING DATA

Test No.________ Date________ Location 19________ Engr. SOTTER

Fuel #2 OIL Atom.Type AIR Capacity 17,500 LB/HR

Test Comments ________________

| | 19-77 | | 19-78 | | 19-79 | | 19-80 | | 19-81 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test Number | ~~1-6~~ | | ~~3A2b~~ | | ~~3B2b~~ | | ~~3B2b~~ | | ~~3C2b~~ | |
| 2. Date | 20 JAN 76 | | 20 JAN 76 | | → | | → | | → | |
| 3. Time | 07:45 | | 08:30 | | 08:50 | | 09:15 | | 9:55 | |
| 4. Load | 14,000 | | 14,300 | | 14,300 | | 14,300 | | 14,200 | |
| 5. Test Purpose | #2 BASELINE | | ϕ=1.35<br>LO O2 WITH CO | | → | | → | | → | |
| 6. Excess $O_2$ Condition | NOM | | LO | | LO | | LO | | LO | |
| 7. Cont. Room $O_2$ (%) | 3.0 | | 1.9 | | 1.9 | | 1.9 | | 1.8 | |
| 8. Pres.Furn/Windbox(iwg) | 0.45 | 1.7 | 0.38 | 1.2 | 0.38 | 1.2 | 0.40 | 1.25 | 0.40 | 1.25 |
| 9. Uptake (iwg) | -0.20 | | -0.20 | | -0.21 | | -0.19 | | -0.20 | |
| 10. Final Stm Press (psig) | 98 | | 97 | | 97 | | 97 | | 98 | |
| 11. Drum Press (psig) | 102 | | 99 | | 100 | | 100 | | 99 | |
| 12. F. Water P/T (psig/°F) | 217 | 222 | 213 | | 213 | STEAM | 215 | 222 | 218 | 222 |
| 13. Air FD Fan Amps | 8.9 | | 8.1 | | 8.1 | | 8.1 | | 8.2 | |
| 14. Air Temp @ FD Fan/CR(°F) | 87 | | 94 | | 90 | | 90 | | 90 | |
| 15. Stack Temp (°F) | 510 | | 513 | | 511 | | 511 | | 514 | |
| 16. Fuel Flow (CFM or GPM) | 2.14 | | 2.19 | | 2.19 | | 2.21 | | 2.14 | |
| 17. Fuel Pres/Temp(psi/°F) | 117 | 52 | 116 | 51 | 116 | 51 | 116 | 51 | 116 | 52 |
| 18. Fuel Atom Pres (psig) | 29 | | 29 | | 29 | | 29 | | 29 | |
| 19. Primary Reg. Setting | -8 | | -8 | | -8 | | -8 | | -8 | |
| 20. FGR Reg. Setting | C | | C | | C | | C | | C | |
| 21. ΔP Pitot FGR Duct(iwg) | — | | — | | — | | — | | — | |
| 22. ΔP Orif. FGR Duct(iwg) | — | | — | | — | | — | | — | |
| 23. Temp. FGR Duct (°F) | — | | — | | — | | — | | — | |
| 24. Pstat FGR Duct (psig) | — | | — | | — | | — | | — | |
| 25. Pstat S.A. Fan (psig) | 0 | | 2.5 | | 2.6 | | 2.6 | | 3.0 | |
| 26. Vortex FD Fan Blades | 1.28 | | 0.74 | | 0.74 | | 0.74 | | 0.74 | |
| 27. Vortex SA Fan Blades | 0 | | 10.5 | | 10.5 | | 10.5 | | 10.5 | |
| 28. SA Depth/Flow (ft/cfm) | — | — | 4 | | 5 | | 5 | | 6 | |
| 29. % FGR | 0 | | 0 | | 0 | | 0 | | 0 | |
| 30. Total Oil Burned #2/#6 | — | — | — | — | — | — | — | — | — | — |
| 31. Total Gas Burned | 0 | | 0 | | 0 | | 0 | | 0 | |

| | | | | |
|---|---|---|---|---|
| 7000 | 7000 | 7000 | 7900 | 8000 |
| 24.0 | 24.1 | 24.1 | 24.1 | 24.1 |
| 3" | 3 | 3 | 3 | 3 |

Data Sheet 6003-16

## UNIT OPERATING DATA

Test No.
Date
Location 19
Engr. SOTTER
Fuel #2 OIL
Atom.Type AIR
Capacity 17,500 LB/HR
Test Comments Φ = 1.3 NOT ACHIEVED BECAUSE OF SMOKING AT LOW SECONDARY AIR

| | 19-82 | | 19-83 | | 19-84 | | 19-85 | | 19-86 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test Number | 302b | | ~~4C2P~~ | | ~~4C21~~ | | → | | 3A1b | |
| 2. Date | 20 JAN 76 | | → | | → | | → | | 21 JAN 76 | |
| 3. Time | 10:05 | | 13:55 | | 15:30 | | 17:00 | | 10:35 | |
| 4. Load | 14 160 | | 14,500 | | 14,600 | | 14,600 | | 13,600 | |
| 5. Test Purpose | Φ=1.3 #2 OIL<br>LOW O2 | | V TRAVERSE | | HI RECIRC<br>LO O2 IMPACTOR | | → | | REPEAT 19-83<br>AS BASELINE | |
| 6. Excess O2 Condition | 1.6 | | LO | | LO | | LO | | NOM | |
| 7. Cont. Room O2 (%) | 1.6 | | 0.7 | | 0.5 | | — | | 2.3 | |
| 8. Pres.Furn/Windbox(iwg) | 0.45 | 1.65 | 0.80 | 3.2 | 0.86 | 3.2 | 0.85 | 3.3 | 0.38 | 1.1 |
| 9. Uptake (iwg) | -0.18 | | -0.18 | | -0.18 | | -0.18 | | -0.20 | |
| 10. Final Stm Press (psig) | 98 | | 97 | | 98 | | 98 | | 98 | |
| 11. Drum Press (psig) | 98 | | 97 | | 98 | | 98 | | 98 | |
| 12. F. Water P/T (psig/°F) | 216 | 222 | 220 | 222 | 220 | 222 | 219 | 222 | 219 | 222 |
| 13. Air FD Fan Amps | 8.0 | | 9.0 | | 9.4 | | 9.4 | | 7.9 | |
| 14. Air Temp @ FD Fan/~~CR~~ 2°FAN (°F) | 90 | | 95 | | 100 | 79 | 93 | | 88 | 76 |
| 15. Stack Temp (°F) | 514 | | 581 | | 582 | | 583 | | 492 | |
| 16. Fuel Flow (~~CFH or~~ GPM) | 2.17 | | 2.18 | | 2.24 | | 2.24 | | 2.11 | |
| 17. Fuel Pres/Temp (psi/°F) | 116 | 51 | 116 | 54 | 116 | 55 | 116 | 54 | 110 | 54 |
| 18. Fuel Atom Pres (psig) | 29 | | 29 | | 29 | | 30 | | 28 | |
| 19. Primary Reg. Setting | -8 | | -8 | | -8 | | -8 | | -8 | |
| 20. FGR Reg. Setting | C | | FULL OPEN | | C | | C | | C | |
| 21. ΔP Pitot FGR Duct(iwg) | — | | — | | — | | — | | — | |
| 22. ΔP Orif. FGR Duct(iwg) | — | | 0.80 | | 0.80 | | 0.80 | | — | |
| 23. Temp. FGR Duct (°F) | — | | 550 | | 552 | | 555 | | — | |
| 24. Pstat FGR Duct (psig) | — | | 3.9 | | 2.7 | | 4.1 | | — | |
| 25. Pstat S.A. Fan (psig) | 3.0 | | — | | — | | — | | 4.9 | |
| 26. Vortex FD Fan Blades | 0.74 | | 1.10 | | 1.10 | | 1.15 | | 0.56 | |
| 27. Vortex SA Fan Blades | 10.5 | | — | | — | | — | | — | |
| 28. SA Depth/Flow (ft/cfm) | 7' | | + | | + | | + | | 4' | |
| 29. % FGR | 0 | | MAX | | MAX | | MAX | | 0 | |
| 30. Total Oil Burned #2/#6 | + | | + | | + | | + | | + | |
| 31. Total Gas Burned | 0 | | 0 | | 0 | | 0 | | 0 | |

| | | | | |
|---|---|---|---|---|
| 8000 | 7000 | 7300 | 7500 | 6500 |
| 24.1 | 24.1 | 24.2 | 25.0 | 24.0 |
| 3 | 3 | 3 | | 3 |

Data Sheet 6003-16

## UNIT OPERATING DATA

Test No.________ Date________ Location 19 Engr. SOTTER

Fuel #2 OIL Atom.Type AIR Capacity 17,500 LB/HR

Test Comments________

| | 19-87 | | 19-88 | | 19-89 | | 19-90 | | 19-91 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test Number | ~~3A2C~~ | | ~~3A2C~~ | | ~~3B2C~~ | | ~~3C2C~~ | | 3D2C | |
| 2. Date | 21 JAN 76 | | 21 JAN 76 | | 21 JAN 76 | | → | | → | |
| 3. Time | 11:30 | | 13:45 | | 14:00 | | 14:20 | | 14:35 | |
| 4. Load | 14,200 | | 14,200 | | 14,200 | | 14,200 | | 14,200 | |
| 5. Test Purpose | SMOKE, TSC<br>HI Φ → | | SWIRLING 2° AIR<br>→ | | →<br>→ | | →<br>→ | | →<br>→ | |
| 6. Excess $O_2$ Condition | LO | | LO | | LO | | LO | | LO | |
| 7. Cont. Room $O_2$ (%) | 1.9 | | 2.1 | | 2.0 | | 2.0 | | 2.1 | |
| 8. Pres.Furn/Windbox(iwg) | 0.38 | 1.1 | 0.40 | 1.05 | 0.39 | 1.1 | 0.39 | 1.1 | 0.39 | 1.1 |
| 9. Uptake (iwg) | -0.20 | | -0.20 | | -0.20 | | -0.20 | | -0.20 | |
| 10. Final Stm Press (psig) | 98 | | 98 | | 98 | | 98 | | 98 | |
| 11. Drum Press (psig) | 98 | | 98 | | 98 | | 98 | | 98 | |
| 12. F. Water P/T (psig/°F) | 221 | 222 | 221 | 222 | 220 | 222 | 220 | 222 | 220 | 222 |
| 13. Air FD Fan Amps | 8.0 | | 8.0 | | 7.9 | | 7.8 | | 8.0 | |
| 14. Air Temp @ FD Fan/CR(°F) | 91 | | 94 | | 91 | | 88 | | 89 | |
| 15. Stack Temp (°F) | 498 | | 498 | | 499 | | 502 | | 500 | |
| 16. Fuel Flow (CFM or GPM) | 2.16 | | 2.15 | | 2.18 | | 2.14 | | 2.17 | |
| 17. Fuel Pres/Temp(psi/°F) | 110 | 54 | 110 | 55 | 110 | 55 | 110 | 54 | 110 | 55 |
| 18. Fuel Atom Pres (psig) | 28 | | 28 | | 28 | | 28 | | 28 | |
| 19. Primary Reg. Setting | -8 | | -8 | | -8 | | -8 | | -8 | |
| 20. FGR Reg. Setting | C | | C | | C | | C | | C | |
| 21. ΔP Pitot FGR Duct(iwg) | — | | — | | — | | — | | — | |
| 22. ΔP Orif. FGR Duct(iwg) | — | | — | | — | | — | | — | |
| 23. Temp. FGR Duct (°F) | — | | — | | — | | — | | — | |
| 24. Pstat FGR Duct (psig) | — | | — | | — | | — | | — | |
| 25. Pstat S.A. Fan (psig) | 5.0 | | 5.0 | | 5.2 | | 5.5 | | 5.8 | |
| 26. Vortex FD Fan Blades | 0.56 | | 0.58 | | 0.58 | | 0.58 | | 0.58 | |
| 27. Vortex SA Fan Blades | 10.1 | | 10.1 | | 10.3 | | 10.3 | | 10.3 | |
| 28. SA Depth/Flow (ft/cfm) | 4' | RADIAL | 4' | CO-SWIRL | 5' | CO-SWIRL | 6' | | 6'11" | |
| 29. % FGR | 0 | | 0 | | 0 | | 0 | | 0 | |
| 30. Total Oil Burned #2/#6 | + | | + | | + | | + | | + | |
| 31. Total Gas Burned | 0 | | 0 | | 0 | | 0 | | 0 | |
| | 6700 | | 7300 | | 7400 | | 7300 | | 7300 | |
| | 24.0 | | 24.0 | | 24.0 | | 24.0 | | 24.0 | |
| | 3" | | 3" | | 3 | | 3 | | 3 | |

Data Sheet 6003-16

## UNIT OPERATING DATA

Test No.______ Date______ Location 19 Engr. SOTTER

Fuel #2 OIL Atom.Type AIR Capacity 17,500

Test Comments ______

| | 19-92 | | 19-93 | | 19-94 | | 19-95 | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test Number | 3A2b | | ~~3B2b~~ | | ~~3C2b~~ | | ~~3D2B~~ | | | |
| 2. Date | 21 JAN 76 | | → | | → | | → | | | |
| 3. Time | 15:00 | | 15:10 | | 15:30 | | 15:45 | | | |
| 4. Load | 14,200 | | 14,200 | | 14,200 | | 14,200 | | | |
| 5. Test Purpose | SMOKE, TSC #2 φ=1.2 | | → | | → | | → | | | |
| 6. Excess $O_2$ Condition | LO | | LO | | LO | | LO | | | |
| 7. Cont. Room $O_2$ (%) | 1.6 | | 1.4 | | 1.0 | | 0.8 | | | |
| 8. Pres.Furn/Windbox(iwg) | 0.33 | 1.1 | 0.33 | 1.1 | 0.33 | 1.1 | 0.33 | 1.1 | | |
| 9. Uptake (iwg) | -0.21 | | -0.21 | | -0.21 | | -0.21 | | | |
| 10. Final Stm Press (psig) | 98 | | 98 | | 98 | | 98 | | | |
| 11. Drum Press (psig) | 98 | | 98 | | 98 | | 98 | | | |
| 12. F. Water P/T (psig/°F) | 221 | 222 | 220 | 222 | 220 | 222 | 220 | 222 | | |
| 13. Air FD Fan Amps | 8.1 | | 8.2 | | 8.4 | | 8.4 | | | |
| 14. Air Temp @ FD Fan/CR(°F) | 91 | | 92 | | 90 | | 88 | | | |
| 15. Stack Temp (°F) | 505 | | 504 | | 506 | | 506 | | | |
| 16. Fuel Flow (CFM or GPM) | 2.11 | | 2.17 | | 2.20 | | 2.17 | | | |
| 17. Fuel Pres/Temp(psi/°F) | 110 | 55 | 110 | 55 | 110 | 55 | 110 | 55 | | |
| 18. Fuel Atom Pres (psig) | 28 | | 28 | | 28 | | 28 | | | |
| 19. Primary Reg. Setting | -8 | | -8 | | -8 | | -8 | | | |
| 20. FGR Reg. Setting | C | | C | | C | | C | | | |
| 21. ΔP Pitot FGR Duct(iwg) | — | | — | | — | | — | | | |
| 22. ΔP Orif. FGR Duct(iwg) | — | | — | | — | | — | | | |
| 23. Temp. FGR Duct (°F) | — | | 125 | | — | | — | | | |
| 24. Pstat FGR Duct (psig) | — | | — | | — | | — | | | |
| 25. Pstat S.A. Fan (psig) | 2.6 | | 2.6 | | 2.9 | | 2.9 | | | |
| 26. Vortex FD Fan Blades | 0.67 | | 0.66 | | 0.66 | | 0.67 | | | |
| 27. Vortex SA Fan Blades | 10.8 | | 10.7 | | 10.8 | | 10.8 | | | |
| 28. SA Depth/Flow (ft/cfm) | 4 | | 5 | | 6 | | 6'11" | | | |
| 29. % FGR | 0 | | 0 | | 0 | | 0 | | | |
| 30. Total Oil Burned #2/#6 | — | — | — | — | — | — | — | — | | |
| 31. Total Gas Burned | 0 | | 0 | | 0 | | 0 | | | |
| | 7300 | | 7300 | | 7300 | | 7300 | | | |
| | 24.0 | | 24.0 | | 24.0 | | 24.0 | | | |
| | 3" | | 3" | | 3" | | 3" | | | |

Data Sheet 6003-16

## UNIT OPERATING DATA

Test No.______ Date______ Location 19 Engr. SOTTER

Fuel #2 + #6 OIL Atom.Type AIR Capacity 17,500 LB/HR

Test Comments ______

| | 19-96 | | 19-97 | | 19-98 | | 19-99 | | 10-100 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test Number | ~~1-16~~ | | ~~11-4P~~ | | ~~11-4P~~ | | ~~11-4I~~ | | ~~1-17~~ | |
| 2. Date | 24 JAN 76 | | → | | → | | → | | 25 JAN 76 | |
| 3. Time | 08:15 | | 10:30 | | 11:40 | | 14:30 | | 08:25 | |
| 4. Load | 14,200 | | 13,800 | | 14,800 | | 14,000 | | 13 700 | |
| 5. Test Purpose | #2 BASELINE | | #6 BASELINE PARTIC. | | → | | → | | #2 BASELINE | |
| 6. Excess $O_2$ Condition | NOM | | NOM | | NOM | | NOM | | NOM | |
| 7. Cont. Room $O_2$ (%) | 2.8 | | 2.6 | | 2.7 | | 2.5 | | — | |
| 8. Pres.Furn/Windbox(iwg) | 0.40 | 1.7 | 0.35 | 1.6 | 0.35 | 1.6 | 0.38 | 1.6 | 0.40 | 1.7 |
| 9. Uptake (iwg) | -0.22 | | -0.22 | | -0.22 | | -0.22 | | -0.22 | |
| 10. Final Stm Press (psig) | 97 | | 98 | | 98 | | 97 | | 97 | |
| 11. Drum Press (psig) | 98 | | 98 | | 98 | | 98 | | 97 | |
| 12. F. Water P/T (psig/°F) | 210 | 222 | 215 | 222 | 222 | 222 | 216 | 212 | | 200 |
| 13. Air FD Fan Amps | 8.2 | | 8.7 | | 8.8 | | 8.8 | | 8.9 | |
| 14. Air Temp @ FD Fan/CR(°F) | 81 | | 85 | | 88 | | 92 | | 85 | |
| 15. Stack Temp (°F) | 520 | | 511 | | 513 | | 517 | | 513 | |
| 16. Fuel Flow (~~CFM or~~ GPM) | 2.26 | | 2.22 | | 2.22 | | 2.21 | | — | |
| 17. Fuel Pres/Temp(psi/°F) | 118 | 50 | 130 | 192 | 130 | 194 | 129 | 194 | 110 | 54 |
| 18. Fuel Atom Pres (psig) | 29 | | 32 | | 32 | | 32 | | 27 | |
| 19. Primary Reg. Setting | -8 | | -8 | | -8 | | -8 | | -8 | |
| 20. FGR Reg. Setting | C | | C | | C | | C | | C | |
| 21. ΔP Pitot FGR Duct(iwg) | — | | — | | — | | — | | — | |
| 22. ΔP Orif. FGR Duct(iwg) | — | | — | | — | | — | | — | |
| 23. Temp. FGR Duct (°F) | — | | — | | — | | — | | — | |
| 24. Pstat FGR Duct (psig) | — | | — | | — | | — | | — | |
| 25. Pstat S.A. Fan (psig) | — | | — | | — | | — | | — | |
| 26. Vortex FD Fan Blades | 1.3 | | 1.15 | | 1.20 | | 1.20 | | 1.25 | |
| 27. Vortex SA Fan Blades | — | | — | | — | | — | | — | |
| 28. SA Depth/Flow (ft/cfm) | + | | + | | + | | + | | + | |
| 29. % FGR | 0 | | 0 | | 0 | | 0 | | 0 | |
| 30. Total Oil Burned #2/#6 | + | | + | | + | | + | | + | |
| 31. Total Gas Burned | 0 | | 0 | | 0 | | 0 | | 0 | |
| | 7000 | | 7500 | | 7100 | | 7000 | | 7500 | |
| | 24.5 | | 26.5 | | 26.2 | | 26.2 | | 22.9 | |
| | 3" | | 3" | | 3 | | 3 | | 3 | |

Data Sheet 6003-16

## UNIT OPERATING DATA

Test No.______ Date______ Location 19 Engr. SOTTER

Fuel #2 Atom.Type AIR Capacity 17,500

Test Comments______

| | 19-101 | | 19-102 | | 19-103 | | 19-104 | | 19-105 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test Number | 5A1b | | ~~5G1b~~ | | ~~5A1b~~ | | ~~5G1b~~ | | 5C1b | |
| 2. Date | 25 JAN 76 | | → | | → | | → | | → | |
| 3. Time | 10:00 | | 10:15 | | 10:35 | | 10:50 | | 11:20 | |
| 4. Load | 14,200 | | 14,200 | | 14,200 | | 14,400 | | 14,500 | |
| 5. Test Purpose | LO RECIRC<br>$\phi = 1.35$ | | → | | MED RECIRC<br>$\phi = 1.35$ | | → | | MAX RECIRC<br>$\phi = 1.35$ | |
| 6. Excess $O_2$ Condition | NOM | | NOM | | NOM | | NOM | | NOM | |
| 7. Cont. Room $O_2$ (%) | 2.9 | | 2.8 | | 2.9 | | 2.8 | | 2.7 | |
| 8. Pres.Furn/Windbox(iwg) | 0.52 | 1.6 | 0.52 | 1.6 | 0.70 | 2.3 | 0.70 | 2.3 | 0.92 | 3.1 |
| 9. Uptake (iwg) | -0.20 | | -0.20 | | -0.20 | | -0.20 | | -0.18 | |
| 10. Final Stm Press (psig) | 97 | | 97 | | 96 | | 97 | | 98 | |
| 11. Drum Press (psig) | 99 | | 98 | | 98 | | 98 | | 98 | |
| 12. F. Water P/T (psig/°F) | 218 | 222 | 217 | 222 | 217 | 222 | 215 | 222 | 222 | 222 |
| 13. Air FD Fan Amps | 8.4 | | 8.0 | | 8.3 | | 8.3 | | 8.6 | |
| 14. Air Temp @ FD Fan/CR(°F) | 100 | | 94 | | 94 | | 99 | | 103 | |
| 15. Stack Temp (°F) | 523 | | 518 | | 549 | | 549 | | 560 | |
| 16. Fuel Flow (~~CFM or~~ GPM) | 2.28 | | 2.21 | | 2.23 | | 2.28 | | 2.29 | |
| 17. Fuel Pres/Temp(psi/°F) | 110 | 55 | 110 | 56 | 110 | 56 | 110 | 56 | 110 | 56 |
| 18. Fuel Atom Pres (psig) | 28 | | 28 | | 28 | | 28 | | 28 | |
| 19. Primary Reg. Setting | -8 | | -8 | | -8 | | -8 | | -8 | |
| 20. FGR Reg. Setting | | | C | | 3.4 | | 3.4 | | MAX | |
| 21. ΔP Pitot FGR Duct(iwg) | 0.009 | | — | | 0.080 | | 0.075 | | 0.18 | |
| 22. ΔP Orif. FGR Duct(iwg) | 0.055 | | 0.055 | | 0.20 | | 0.20 | | 0.80 | |
| 23. Temp. FGR Duct (°F) | 403 | | 406 | | 500 | | 503 | | 540 | |
| 24. Pstat FGR Duct (psig) | 6.1 | | 6.1 | | 5.9 | | 5.4 | | 4.2 | |
| 25. Pstat S.A. Fan (psig) | 5.2 | | 5.9 | | 5.5 | | 5.4 | | 5.3 | |
| 26. Vortex FD Fan Blades | 0.71 | | 0.71 | | 0.71 | | 0.71 | | 0.75 | |
| 27. Vortex SA Fan Blades | 10.1 | | 10.1 | | 10.1 | | 10.1 | | 10.2 | |
| 28. SA Depth/Flow (ft/cfm) | 4 | | 7 | | 7 | | 4' | | 4 | |
| 29. % FGR | | | | | | | | | | |
| 30. Total Oil Burned #2/#6 | — | — | — | — | — | — | — | — | — | — |
| 31. Total Gas Burned | 0 | | 0 | | 0 | | 0 | | 0 | |
| | 7000 | | 7000 | | 6500 | | 6500 | | 7100 | |
| | 23.1 | | 23.2 | | 23.4 | | | | | |
| | 3" | | 3" | | 3 | | 3 | | | |

Data Sheet 6003-16

## UNIT OPERATING DATA

Test No.________ Date________ Location 19 Engr. SOTTER

Fuel________ Atom.Type AIR Capacity 17,500

Test Comments________

| | #2 OIL<br>19-106 | | #6 OIL →<br>19-107 | | 19-108 | | 19-109 | | 19-110 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test Number | | | ~~13A1a~~ | | ~~13B1a~~ | | ~~13C1a~~ | | ~~13D1a~~ | |
| 2. Date | 25 JAN 76 | | → | | → | | → | | → | |
| 3. Time | 11:35 | | 13:25 | | 13:35 | | 13:50 | | 14:00 | |
| 4. Load | 14500 | | 14500 | | 14500 | | 14500 | | 14500 | |
| 5. Test Purpose | HI RECIRC<br>φ=1.35 | | φ=1.2 → | | → | | → | | → | |
| 6. Excess $O_2$ Condition | NOM | | NOM | | NOM | | NOM | | NOM | |
| 7. Cont. Room $O_2$ (%) | 2.4 | | 2.5 | | 2.5 | | 2.2 | | 2.2 | |
| 8. Pres.Furn/Windbox(iwg) | 0.90 | 3.1 | 0.45 | 1.4 | 0.47 | 1.4 | 0.47 | 1.4 | 0.96 | 1.4 |
| 9. Uptake (iwg) | -0.18 | | -0.18 | | -0.18 | | -0.18 | | -0.18 | |
| 10. Final Stm Press (psig) | 98 | | 98 | | 98 | | 98 | | 98 | |
| 11. Drum Press (psig) | 98 | | 98 | | 98 | | 99 | | 98 | |
| 12. F. Water P/T (psig/°F) | 222 | 222 | 222 | 222 | 222 | 222 | 222 | 222 | 222 | 222 |
| 13. Air FD Fan Amps | 8.6 | | 8.3 | | 8.3 | | 8.3 | | 8.4 | |
| 14. Air Temp @ FD Fan/CR (°F) | 100 | | 97 | | 94 | | 91 | | 89 | |
| 15. Stack Temp (°F) | 560 | | 507 | | 508 | | 506 | | 504 | |
| 16. Fuel Flow (CFM or GPM) | — | | 2.26 | | 2.33 | | 2.29 | | — | |
| 17. Fuel Pres/Temp (psi/°F) | 110 | 56 | 130 | 194 | 129 | 194 | 129 | 194 | 129 | 194 |
| 18. Fuel Atom Pres (psig) | 28 | | 32 | | 32 | | 32 | | 32 | |
| 19. Primary Reg. Setting | -8 | | -8 | | -8 | | -8 | | -8 | |
| 20. FGR Reg. Setting | FULL OPEN | | OFF | +CLOSED | OFF | | OFF | | OFF | |
| 21. ΔP Pitot FGR Duct (iwg) | 0.18 | | 0.00 | | 0.00 | | — | | — | |
| 22. ΔP Orif. FGR Duct (iwg) | 0.80 | | 0.34 | | 0.00 | | — | | — | |
| 23. Temp. FGR Duct (°F) | 540 | | 144 | | 138 | | 135 | | 135 | |
| 24. Pstat FGR Duct (psig) | 4.1 | | ~0.05 | | RE-ZERO<br>0.00 | | — | | — | |
| 25. Pstat S.A. Fan (psig) | 5.8 | | 2.8 | | 3.0 | | 3.1 | | 3.2 | |
| 26. Vortex FD Fan Blades | 0.75 | | 0.86 | | 0.86 | | 0.86 | | 0.88 RE-ZERO | |
| 27. Vortex SA Fan Blades | 10.1 | | 10.5 | | 10.5 | | 10.5 | | 10.6 | |
| 28. SA Depth/Flow (ft/cfm) | 7 | | 4 | | 5 | | 6 | | 6'11" | |
| 29. % FGR | | | 0 | | 0 | | 0 | | 0 | |
| 30. Total Oil Burned #2/#6 | + | | + | | + | | + | | + | |
| 31. Total Gas Burned | 0 | | 0 | | 0 | | 0 | | 0 | |
| | 7200 | | 7000 | | 7100 | | 7400 | | 7400 | |
| | 23.5 | | 26.0 | | 26.0 | | 26.0 | | 26.0 | |
| | 3" | | 3 | | 3 | | 3 | | 3 | |

Data Sheet 6003-16

**UNIT OPERATING DATA**

Test No.________ Date________ Location 19 Engr. SOTTER

Fuel #6 Atom. Type AIR Capacity 17,500 LB/HR

Test Comments________

| | 19-111 | | 19-112 | | 19-113 | | 19-114 | | 19-115 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test Number | ~~3A2C~~ | | ~~3D2C~~ | | ~~3A2D~~ | | | | | |
| 2. Date | 25 JAN 76 | | → | | | | → | | 26 JAN 76 | |
| 3. Time | 14:20 | | 14:30 | | 15:00 | | 15:10 | | 09:00 | |
| 4. Load | 14,500 | | 14,500 | | 14,500 | | 14,500 | | 14,100 | |
| 5. Test Purpose | TSC ϕ=1.5<br>SMOKE, CO | | → | | ϕ=1.3<br>SMOKE, CO | | → | | #2 BASELINE | |
| 6. Excess $O_2$ Condition | LO | | LO | | LO | | LO | | NOM | |
| 7. Cont. Room $O_2$ (%) | 2.1 | | 2.0 | | 1.0 | | 0.8 | | 3.0 | |
| 8. Pres.Furn/Windbox(iwg) | 0.42 | 1.3 | 0.41 | 1.3 | 0.33 | 1.2 | 0.31 | 1.2 | 0.50 | 2.0 |
| 9. Uptake (iwg) | -0.19 | | -0.20 | | -0.20 | | -0.20 | | -0.20 | |
| 10. Final Stm Press (psig) | 98 | | 98 | | 98 | | 98 | | 98 | |
| 11. Drum Press (psig) | 98 | | 98 | | 98 | | 98 | | 100 | |
| 12. F. Water P/T (psig/°F) | 220 | | 222 | 222 | - | 222 | 221 | 222 | 215 | 218 |
| 13. Air FD Fan Amps | 8.3 | | 8.0 | | 8.0 | | 8.0 | | 9.0 | |
| 14. Air Temp @ FD Fan/CR (°F) | 95 | | 92 | | 91 | | 88 | | 83 | |
| 15. Stack Temp (°F) | 500 | | 496 | | 496 | | 492 | | 532 | |
| 16. Fuel Flow (~~CFM or~~ GPM) | 2.22 | | 2.27 | | — | | — | | 2.31 | |
| 17. Fuel Pres/Temp (psi/°F) | 129 | 194 | 129 | 194 | 128 | 195 | 128 | 195 | 125 | 54 |
| 18. Fuel Atom Pres (psig) | 32 | | 32 | | 32 | | 32 | | 30 | |
| 19. Primary Reg. Setting | -8 | | -8 | | -8 | | -8 | | -8 | |
| 20. FGR Reg. Setting | C | | C | | C | | C | | C | |
| 21. ΔP Pitot FGR Duct (iwg) | — | | — | | — | | — | | — | |
| 22. ΔP Orif. FGR Duct (iwg) | — | | — | | — | | — | | — | |
| 23. Temp. FGR Duct (°F) | — | | — | | — | | — | | 105 | |
| 24. Pstat FGR Duct (psig) | — | | — | | — | | — | | — | |
| 25. Pstat S.A. Fan (~~psig~~) | 4.5 | | 5.1 | | 2.6 | | 2.9 | | — | |
| 26. Vortex FD Fan Blades | 0.73 | | 0.72 | | 0.71 | | 0.71 | | 1.45 | |
| 27. Vortex SA Fan Blades | 10.4 | | 10.4 | | 10.6 | | 10.6 | | — | |
| 28. SA Depth/Flow (ft/cfm) | 4 | | 6'11" | | 4' | | 7' | | — | — |
| 29. % FGR | | | | | | | | | | |
| 30. Total Oil Burned #2/#6 | — | — | — | — | — | — | — | — | — | — |
| 31. Total Gas Burned | 0 | | 0 | | 0 | | 0 | | 0 | |
| | 7400 | | 7400 | | 7400 | | 7500 | | 8000 | |
| | 26.1 | | 26.1 | | 26.1 | | 26.1 | | 24.9 | |
| | 3 | | 3 | | 3 | | 3 | | 3 | |

Data Sheet 6003-16

## UNIT OPERATING DATA

Test No.______ Date______ Location 19 Engr. SOTTFR

Fuel #2 Atom.Type AIR Capacity 17,500 LB/HR

Test Comments ______

| | 19-116 | | 19-117 | | | | |
|---|---|---|---|---|---|---|---|
| 1. Test Number | 3C2CP | | 3C2CP | | | | |
| 2. Date | 26 JAN 76 | | → | | | | |
| 3. Time | 10:35 | | 11:40 | | | | |
| 4. Load | 14,500 | | 14,600 | | | | |
| 5. Test Purpose | MI Φ<br>PARTICS | | → | | | | |
| 6. Excess $O_2$ Condition | LO | | LO | | | | |
| 7. Cont. Room $O_2$ (%) | 2.3 | | 2.4 | | | | |
| 8. Pres.Furn/Windbox(iwg) | 0.50 | 1.5 | 0.50 | 1.5 | | | |
| 9. Uptake (iwg) | -0.18 | | -0.20 | | | | |
| 10. Final Stm Press (psig) | 100 | | 100 | | | | |
| 11. Drum Press (psig) | 100 | | 100 | | | | |
| 12. F. Water P/T (psig/°F) | 214 | 222 | 217 | 222 | | | |
| 13. Air FD Fan Amps | 8.0 | | 8.2 | | | | |
| 14. Air Temp @ FD Fan/CR(°F) | 87 | | 87 | | | | |
| 15. Stack Temp (°F) | 520 | | 516 | | | | |
| 16. Fuel Flow (CFM or GPM) | 2.30 | | 2.27 | | | | |
| 17. Fuel Pres/Temp(psi/°F) | 125 | 55 | 125 | 55 | | | |
| 18. Fuel Atom Pres (psig) | 30 | | 30 | | | | |
| 19. Primary Reg. Setting | -8 | | -8 | | | | |
| 20. FGR Reg. Setting | C | | C | | | | |
| 21. ΔP Pitot FGR Duct(iwg) | — | | — | | | | |
| 22. ΔP Orif. FGR Duct(iwg) | — | | — | | | | |
| 23. Temp. FGR Duct (°F) | 117 | | 117 | | | | |
| 24. Pstat FGR Duct (psig) | — | | — | | | | |
| 25. Pstat S.A. Fan (psig) | 5.4 | | 5.4 | | | | |
| 26. Vortex FD Fan Blades | 0.82 | | 0.81 | | | | |
| 27. Vortex SA Fan Blades | 10.2 | | 10.2 | | | | |
| 28. SA Depth/Flow (ft/cfm) | 6 | | 6 | | | | |
| 29. % FGR | 0 | | 0 | | | | |
| 30. Total Oil Burned #2/#6 | + | | + | | | | |
| 31. Total Gas Burned | 0 | | 0 | | | | |

7500 8500
250 250
3 3

Data Sheet 6003-16

## UNIT OPERATING DATA

Test No. ________ Date ________ Location 19 Engr. SOTTER

Fuel #2 Atom.Type ________ Capacity ________

Test Comments ________

| | 19-118 | | 19-119 | | 19-120 | | 19-121 | | 19-122 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test Number | ~~1-17~~ | | ~~1-18~~ | | ~~CAL~~ | | ~~CAL~~ | | ~~CAL~~ | |
| 2. Date | 15 FEB 77 | | 16 FEB 77 | | → | | → | | → | |
| 3. Time | 14:15 | | 10:50 | | 11:20 | | 11:35 | | 11:45 | |
| 4. Load | 13700 | | 14500 | | 14200 | | 14200 | | | |
| 5. Test Purpose | BASELINE | | BASELINE | | CAL 2° AIR | | → | | | |
| 6. Excess $O_2$ Condition | NOM | | NOM | | HI | | HI | | | |
| 7. Cont. Room $O_2$ (%) | 2.6 (NO CAL) | | 2.6 (CAL) | | 5.6 | | 5.5 | | | |
| 8. Pres.Furn/Windbox(iwg) | 0.42 | 1.8 | 0.38 | 1.7 | 0.70 | 2.0 | 0.70 | 2.0 | 0.74 | 2.0 |
| 9. Uptake (iwg) | -0.18 | | -0.21 | | -0.19 | | -0.19 | | -0.17 | |
| 10. Final Stm Press (psig) | 99 | | 98 | | 97 | | | | 98 | |
| 11. Drum Press (psig) | 99 | | 98 | | 98 | | 98 | | | |
| 12. F. Water P/T (psig/°F) | 223 | 214 | 200 | 224 | 200 | | 217 | 224 | 215 | |
| 13. Air FD Fan Amps | 8.4 | | 8.5 | | 8.4 | | 8.4 | | 8.5 | |
| 14. Air Temp @ FD Fan/CR (°F) | 84 | | 84 | | 87 | | 87 | | 86 | |
| 15. Stack Temp (°F) | 510 | | 512 | | 532 | | 528 | | 535 | |
| 16. Fuel Flow (CFM or GPM) | 2.10 | | 2.16 | | 2.19 | | 2.16 | | 2.17 | |
| 17. Fuel Pres/Temp (psi/°F) | 123 | 51 | 129 | 53 | 129 | 54 | 129 | 53 | 129 | 53 |
| 18. Fuel Atom Pres (psig) | 28 | | 29 | | 29 | | 29 | | 29 | |
| 19. Primary Reg. Setting | -8 | | -8 | | -8 | | -8 | | -8 | |
| 20. FGR Reg. Setting | C | | C | | C | | C | | C | |
| 21. ΔP Pitot FGR Duct(iwg) | — | | — | | — | | — | | — | |
| 22. ΔP Orif. FGR Duct(iwg) | 0.00 | | — | | — | | — | | — | |
| 23. Temp. FGR Duct (°F) | 105 | | — | | — | | — | | — | |
| 24. Pstat FGR Duct (psig) | 0.55 | | — | | — | | — | | — | |
| 25. Pstat S.A. Fan (psig) | — | | — | | 10.3 | | 10.2 | | 10.1 | |
| 26. Vortex FD Fan Blades | 1.25 | | 1.15 | | 1.15 | | 1.17 | | 1.17 | |
| 27. Vortex SA Fan Blades | — | | — | | 5.0 | | 5.6 | | 5.8 | |
| 28. SA Depth/Flow (ft/cfm) | — | — | — | — | 4 | | 7 | | 4 | |
| 29. % FGR | 0 | | 0 | | 0 | | 0 | | 0 | |
| 30. Total Oil Burned #2/#6 | — | — | — | — | — | — | — | — | — | — |
| 31. Total Gas Burned | 0 | | 0 | | 0 | | 0 | | 0 | |
| ATOM AIR PRESS, PSIG | 23.8 | | 24.0 | | 24.0 | | 24.0 | | 24.0 | |
| STEAM VENT RATE, LB/HR | 7000 | | 6500 | | 6000 | | 7000 | | 7500 | |
| DIFFUSER POS., IN. | | | | | | | | | | |

Data Sheet 6003-16

UNIT OPERATING DATA

Test No.________ Date________ Location 19 Engr. SUTTER

Fuel #2 OIL Atom.Type AIR Capacity 17,500

Test Comments________

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test Number | 19-123 | | 19-124 | | 19-125 | | 19-126 | | 19-127 | |
| 2. Date | 16 FEB 77 | | → | | → | | → | | → | |
| 3. Time | 11:55 | | 12:10 | | 12:20 | | 12:35 | | 12:45 | |
| 4. Load | 13,600 | | 13,700 | | 13,700 | | 13,800 | | 13,900 | |
| 5. Test Purpose | 2° AIR CAL | | → | | → | | → | | → | |
| 6. Excess O2 Condition | HI | | → | | → | | → | | → | |
| 7. Cont. Room O2 (%) | 5.7 | | 5.0 | | | | 4.8 | | 4.7 | |
| 8. Pres.Furn/Windbox(iwg) | 0.76 | 2.0 | 0.68 | 2.0 | 0.67 | 2.0 | 0.62 | 1.95 | 0.61 | 1.95 |
| 9. Uptake (iwg) | -0.18 | | -0.18 | | -0.18 | | -0.20 | | -0.19 | |
| 10. Final Stm Press (psig) | 98 | | 98 | | | | + | | | |
| 11. Drum Press (psig) | | | | | | | — | | | |
| 12. F. Water P/T (psig/°F) | 216 | | 218 | 222 | | | 217 | 222 | | |
| 13. Air FD Fan Amps | 8.6 | | 8.6 | | | | 8.3 | | 8.3 | |
| 14. Air Temp @ FD Fan/CR(°F) | 89 | | 88 | | 90 | | 86 | | 85 | |
| 15. Stack Temp (°F) | 532 | | 530 | | 530 | | | | 529 | |
| 16. Fuel Flow (CFM or GPM) | 2.17 | | 2.13 | | 2.19 | | | | 2.18 | |
| 17. Fuel Pres/Temp(psi/°F) | 129 | | 129 | | 129 | | | 53 | | 53 |
| 18. Fuel Atom Pres (psig) | 29 | | 29 | | 29 | | 29 | | 29 | |
| 19. Primary Reg. Setting | -8 | | -8 | | -8 | | -8 | | -8 | |
| 20. FGR Reg. Setting | C | | C | | C | | C | | C | |
| 21. ΔP Pitot FGR Duct(iwg) | — | | — | | — | | — | | — | |
| 22. ΔP Orif. FGR Duct(iwg) | — | | — | | — | | — | | — | |
| 23. Temp. FGR Duct (°F) | — | | — | | — | | — | | — | |
| 24. Pstat FGR Duct (psig) | — | | — | | — | | — | | — | |
| 25. Pstat S.A. Fan (psig) | 6.4 | | 3.8 | | 4.2 | | 2.9 | | 3.2 | |
| 26. Vortex FD Fan Blades | 1.17 | | 1.17 | | 1.17 | | 1.17 | | 1.17 | |
| 27. Vortex SA Fan Blades | 16.1 | | 10.5 | | 10.6 | | 16.8 | | 10.8 | |
| 28. SA Depth/Flow (ft/cfm) | 7 | | 4 | | 7 | | 4 | | 7 | |
| 29. % FGR | 0 | | 0 | | 0 | | 0 | | 0 | |
| 30. Total Oil Burned #2/#6 | + | | + | | + | | + | | + | |
| 31. Total Gas Burned | 0 | | 0 | | 0 | | 0 | | 0 | |
| | 24.0 | | 24.0 | | 24.0 | | 24.0 | | 24.0 | |
| | 7500 | | 7000 | | | | | | 7000 | |

Data Sheet 6003-16

## UNIT OPERATING DATA

Test No.______ Date______ Location 19 Engr. SOTTEC

Fuel #6 OIL Atom.Type AIR Capacity ______

Test Comments ______

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1. Test Number | | 19-128 | | 19-129 | | 19-130 | | 19-151 | |
| 2. Date | | 16 FEB 77 | | 16 FEB 77 | | → | | 17 FEB 77 | |
| 3. Time | | 16:00 | | 16:30 | | 16:45 | | 08:25 | |
| 4. Load | | 14,000 | | 13,700 | | 13,700 | | 13,900 | |
| 5. Test Purpose | | #6 BASELINE | | #6 MAX Φ + RECIRC | | → | | #6 BASELINE | |
| 6. Excess O2 Condition | | NOM | | NOM | | NOM | | NOM | |
| 7. Cont. Room O2 (%) | | 2.7 | | 2.7 | | 2.6 | | 3.0 | |
| 8. Pres.Furn/Windbox(iwg) | | 0.34 | 1.8 | 0.80 | 3.0 | 0.80 | 3.0 | 0.34 | 1.7 |
| 9. Uptake (iwg) | | -0.21 | | -0.22 | | -0.21 | | -0.22 | |
| 10. Final Stm Press (psig) | | 99 | | 98 | | 98 | | 95 | |
| 11. Drum Press (psig) | | 98 | | 98 | | 98 | | 99 | |
| 12. F. Water P/T (psig/°F) | | 215 | | 215 | | 215 | 222 | 199 | 222 |
| 13. Air FD Fan Amps | | 8.9 | | 8.0 | | 8.0 | | 8.4 | |
| 14. Air Temp @ FD Fan/CR(°F) | | 82 | | 100 | | 98 | | 80 | |
| 15. Stack Temp (°F) | | 516 | | 568 | | 562 | | 500 | |
| 16. Fuel Flow (CFM or GPM) | | 2.23 | | | | 2.18 | | 2.15 | |
| 17. Fuel Pres/Temp(psi/°F) | | 126 | 192 | 126 | 194 | 126 | 194 | 126 | 194 |
| 18. Fuel Atom Pres (psig) | | 34 | | 34 | | 34 | | 33 | |
| 19. Primary Reg. Setting | | -8 | | -8 | | -8 | | -8 | |
| 20. FGR Reg. Setting | | C | | MAX | | MAX | | C | |
| 21. ΔP Pitot FGR Duct(iwg) | | — | | 0.46 | | 0.5 | | — | |
| 22. ΔP Orif. FGR Duct(iwg) | | — | | 0.80 | | 0.80 | | — | |
| 23. Temp. FGR Duct (°F) | | — | | 545 | | 540 | | 102 | |
| 24. Pstat FGR Duct (psig) | | — | | 4.2 | | 4.2 | | — | |
| 25. Pstat S.A. Fan (psig) | | — | | 10.2 | | 10.0 | | — | |
| 26. Vortex FD Fan Blades | | 1.25 | | 0.62 | | 0.60 | | 1.2 | |
| 27. Vortex SA Fan Blades | | — | | 5.7 | | 6.2 | | — | |
| 28. SA Depth/Flow (ft/cfm) | | — | — | 4 | | 7 | | — | — |
| 29. % FGR | | 0 | | | | | | 0 | |
| 30. Total Oil Burned #2/#6 | | — | — | — | — | — | — | — | — |
| 31. Total Gas Burned | | 0 | | 0 | | 0 | | 0 | |

25.1 25.1 25.1 25.1

6500 7000 6500 6500

Data Sheet 6003-16

## UNIT OPERATING DATA

Test No.__________ Date__________ Location 19 Engr. SOTTER

Fuel #6 OIL Atom.Type__________ Capacity__________

Test Comments__________

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test Number | 19-132 | | → | | 19-133 | | 19-134 | | 19-135 | |
| 2. Date | 17 FEB 77 | | → | | 18 FEB 77 | | → | | → | |
| 3. Time | 9:50 | | 11:05 | | 08:15 | | 10:20 | | 10:40 | |
| 4. Load | 14500 | | 13900 | | 13900 | | 13900 | | 13700 | |
| 5. Test Purpose | LOW $O_2$ PARTIC. MS | | → | | BASELINE | | MED RECIRC<br>HI & LO $O_2$ | | → | |
| 6. Excess $O_2$ Condition | LO | | → | | NOM | | LO | | LO | |
| 7. Cont. Room $O_2$ (%) | 0.4 | | 0.4 | | 2.4 | | 1.0 | | 1.2 | |
| 8. Pres.Furn/Windbox(iwg) | 0.20 | 1.3 | 0.20 | 1.3 | 0.30 | 1.6 | 0.6 | 2.2 | 0.6 | 2.2 |
| 9. Uptake (iwg) | -0.22 | | -0.23 | | -0.23 | | -0.22 | | -0.22 | |
| 10. Final Stm Press (psig) | 95 | | 93 | | 92 | | 98 | | 96 | |
| 11. Drum Press (psig) | 95 | | 95 | | 95 | | 98 | | 96 | |
| 12. F. Water P/T (psig/°F) | 214 | 222 | 215 | 222 | 210 | 222 | 215 | 222 | 217 | |
| 13. Air FD Fan Amps | 8.0 | | 7.9 | | 8.1 | | 7.4 | | 7.5 | |
| 14. Air Temp @ FD Fan/CR(°F) | 80 | | 79 | | 75 | | 101 | | 104 | |
| 15. Stack Temp (°F) | 490 | | 508 | | 514 | | 553 | | 553 | |
| 16. Fuel Flow (CFM or GPM) | 2.16 | | 2.19 | | 2.20 | | 2.20 | | 2.12 | |
| 17. Fuel Pres/Temp(psi/°F) | 127 | 191 | 127 | 191 | 133 | 192 | 133 | 197 | 133 | 196 |
| 18. Fuel Atom Pres (psig) | 33 | | 33 | | 33 | | 34 | | 34 | |
| 19. Primary Reg. Setting | -8 | | -8 | | -8 | | -9 | | -9 | |
| 20. FGR Reg. Setting | C | | C | | C | | 2.9 | | 2.9 | |
| 21. ΔP Pitot FGR Duct(iwg) | — | | — | | — | | 0.3 | | — | |
| 22. ΔP Orif. FGR Duct(iwg) | — | | — | | — | | 0.38 | | 0.39 | |
| 23. Temp. FGR Duct (°F) | — | | — | | — | | 523 | | 522 | |
| 24. Pstat FGR Duct (psig) | — | | — | | — | | 4.9 | | 4.9 | |
| 25. Pstat S.A. Fan (psig) | — | | — | | — | | 10.0 | | | |
| 26. Vortex FD Fan Blades | 0.86 | | 0.84 | | 1.15 | | 0.46 | | | |
| 27. Vortex SA Fan Blades | — | | — | | — | | 5.6 | | 5.9 | |
| 28. SA Depth/Flow (ft/cfm) | — | — | — | — | — | — | 4 | | 5 | |
| 29. % FGR | 0 | | 0 | | 0 | | | | | |
| 30. Total Oil Burned #2/#6 | — | — | — | — | — | — | — | — | — | — |
| 31. Total Gas Burned | 0 | | 0 | | 0 | | 0 | | 0 | |
| | 25.0 | | 25.0 | | 25.0 | | 25.9 | | 25.9 | |
| | 6500 | | 5500 | | 5500 | | 10500 | | 9000 | |

Data Sheet 6003-16

## UNIT OPERATING DATA

Test No.______ Date______ Location 19 Engr. SETTER

Fuel #6 OIL Atom.Type AIR Capacity ______

Test Comments ______

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test Number | 19-136 | | 19-137 | | 19-138 | | 19-139 | | 19-140 | |
| 2. Date | 18 FEB 77 | | → | | → | | → | | → | |
| 3. Time | 13:25 | | 13:45 | | 14:00 | | 14:20 | | 14:50 | |
| 4. Load | 14,600 | | 14,400 | | 14,300 | | 14,300 | | 14,200 | |
| 5. Test Purpose | MID RECIRC<br>HI Φ | | LO RECIRC<br>HI Φ | | → | | NO RECIRC<br>HI Φ | | LO RECIRC<br>HI Φ | |
| 6. Excess $O_2$ Condition | LO | | LO | | LO | | LO | | NOM | |
| 7. Cont. Room $O_2$ (%) | 1.0 | | 1.7 | | 2.0 | | 1.6 | | 2.5 | |
| 8. Pres.Furn/Windbox(iwg) | 0.63 | 2.1 | 0.52 | 1.7 | 0.52 | 1.65 | 0.43 | 1.2 | 0.80 | 2.5 |
| 9. Uptake (iwg) | -0.18 | | -0.18 | | -0.20 | | -0.20 | | -0.20 | |
| 10. Final Stm Press (psig) | 94 | | 94 | | 94 | | 94 | | 93 | |
| 11. Drum Press (psig) | 94 | | 94 | | 95 | | 95 | | 94 | |
| 12. F. Water P/T (psig/°F) | 216 | 222 | 215 | 222 | 215 | 222 | 214 | 222 | | 222 |
| 13. Air FD Fan Amps | 7.2 | | 7.5 | | 7.5 | | 7.2 | | 8.2 | |
| 14. Air Temp @ FD Fan/CR (°F) | 105 | | 105 | | 104 | | 121 | | 107 | |
| 15. Stack Temp (°F) | 549 | | 530 | | 528 | | 513 | | 561 | |
| 16. Fuel Flow (CFM or GPM) | 2.28 | | 2.30 | | 2.23 | | 2.28 | | 2.17 | |
| 17. Fuel Pres/Temp (psi/°F) | 133 | 192 | 132 | 192 | 133 | 192 | 133 | 192 | 133 | 192 |
| 18. Fuel Atom Pres (psig) | 34 | | 34 | | 34 | | 34 | | 34 | |
| 19. Primary Reg. Setting | -9 | | -9 | | -9 | | -9 | | -9 | |
| 20. FGR Reg. Setting | 3.3 | | 3.8 | | 3.7 | | C | | — | |
| 21. ΔP Pitot FGR Duct (iwg) | 0.4 | | 0.05 | | — | | — | | 0.1 | |
| 22. ΔP Orif. FGR Duct (iwg) | 0.177 | | 0.043 | | 0.041 | | 0.012 (ZERO DRIFT) | | 0.22 | |
| 23. Temp. FGR Duct (°F) | 497 | | 440 | | 425 | | 335 | | 517 | |
| 24. Pstat FGR Duct (psig) | 5.5 | | 6.2 | | 5.6 | | — | | 5.4 | |
| 25. Pstat S.A. Fan (psig) | 9.9 | | 10.0 | | 10.0 | | 10.0 | | 10.0 | |
| 26. Vortex FD Fan Blades | 0.508 | | 0.55 | | 0.55 | | 0.51 | | 0.64 | |
| 27. Vortex SA Fan Blades | 5.6 | | 5.8 | | 5.9 | | 5.8 | | 5.7 | |
| 28. SA Depth/Flow (ft/cfm) | 4 | | 4 | | 5 | | 4 | | 4 | |
| 29. % FGR | | | | | | | 0 | | | |
| 30. Total Oil Burned #2/#6 | | | | | | | | | | |
| 31. Total Gas Burned | 0 | | 0 | | 0 | | 0 | | 0 | |
| | 25.5 | | 25.5 | | 25.5 | | 25.5 | | 25.2 | |
| | 6500 | | 6500 | | 6500 | | 6500 | | 6500 | |
| DIFFUSER POS., IN. | 2.9 | | 2.9 | | 2.9 | | 2.9 | | 2.9 | |

Data Sheet 6003-16

**UNIT OPERATING DATA**

Test No.__________ Date__________ Location 19 Engr. SOTTER

Fuel #6 OIL Atom Type__________ Capacity__________

Test Comments__________

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test Number | 19-141 | | 19-142 | | 19-143 | | → | | 19-144 | |
| 2. Date | 18 FEB 77 | | 21 FEB 77 | | → | | → | | → | |
| 3. Time | 15:00 | | 09:25 | | 10:20 | | 11:25 | | 12:35 | |
| 4. Load | 14,200 | | 14,200 | | 13,600 | | 13,900 | | 13,900 | |
| 5. Test Purpose | LO RECIRC<br>HI Φ | | #6<br>BASELINE | | HI Φ LOW $O_2$<br>PARTICS | | → | | → | |
| 6. Excess $O_2$ Condition | NOM | | NOM | | SMOKE<br>THRESHOLD | | → | | → | |
| 7. Cont. Room $O_2$ (%) | 2.2 | | 2.8 | | 3.6 | | 2.8 | | 2.8 | |
| 8. Pres.Furn/Windbox(iwg) | 0.79 | 2.5 | 0.35 | 1.7 | 0.35 | 1.7 | 0.40 | 1.2 | 0.41 | 1.2 |
| 9. Uptake (iwg) | -0.19 | | -0.22 | | -0.20 | | -0.19 | | -0.19 | |
| 10. Final Stm Press (psig) | 93 | | 94 | | 96 | | 95 | | 95 | |
| 11. Drum Press (psig) | 94 | | 95 | | 95 | | 95 | | 95 | |
| 12. F. Water P/T (psig/°F) | 217 | 222 | 219 | 220 | 215 | 222 | 218 | 222 | 218 | 222 |
| 13. Air FD Fan Amps | 8.0 | | 8.5 | | 7.6 | | 7.6 | | 8.0 | |
| 14. Air Temp @ FD Fan/CR(°F) | 104 | | 83 | | 87 | | 89 | | 91 | |
| 15. Stack Temp (°F) | 562 | | 521 | | 503 | | 508 | | 510 | |
| 16. Fuel Flow (CFM or GPM) | 2.21 | | 2.13 | | 2.17 | | 2.13 | | 2.13 | |
| 17. Fuel Pres/Temp(psi/°F) | 133 | 192 | 127 | 192 | 129 | 193 | 126 | 195 | 125 | 196 |
| 18. Fuel Atom Pres (psig) | 34 | | 34 | | 34 | | 34 | | 34 | |
| 19. Primary Reg. Setting | -9 | | -8 | | -8 | | -8 | | -8 | |
| 20. FGR Reg. Setting | | | C | | C | | C | | C | |
| 21. ΔP Pitot FGR Duct(iwg) | 0.07 | | — | | — | | — | | — | |
| 22. ΔP Orif. FGR Duct(iwg) | 0.22 | | — | | — | | — | | — | |
| 23. Temp. FGR Duct (°F) | 523 | | 107 | | — | | — | | — | |
| 24. Pstat FGR Duct (psig) | 5.4 | | — | | — | | — | | — | |
| 25. Pstat S.A. Fan (psig) | 10.0 | | — | | 10.0 | | 10.0 | | 10.0 | |
| 26. Vortex FD Fan Blades | 0.64 | | 1.17 | | 0.53 | | 0.54 | | 0.54 | |
| 27. Vortex SA Fan Blades | 6.2 | | — | | 5.9 | | 5.9 | | 5.8 | |
| 28. SA Depth/Flow (ft/cfm) | 7 | | + | | 5 | | 5 | | 5 | |
| 29. % FGR | | | 0 | | 0 | | 0 | | 0 | |
| 30. Total Oil Burned #2/#6 | + | | + | | + | | + | | + | |
| 31. Total Gas Burned | 0 | | 0 | | 0 | | 0 | | 0 | |
| ATOM. AIR | 25.1 | | 25.0 | | 25.1 | | 25.1 | | 25.0 | |
| STEAM VENT | 6500 | | 6500 | | 6000 | | 6400 | | 6300 | |
| DIFFUSER | 2.9 | | 2.9 | | 2.9 | | 2.9 | | 2.9 | |
| OPACITY (APPROX) | .60 | | | | | | | | | |

Data Sheet 6003-16

## UNIT OPERATING DATA

Test No.______ Date______ Location 19 ______ Engr. SOTTER

Fuel #6, #2, + GAS Atom.Type ______ Capacity ______

Test Comments ______

| | #6 OIL | | #2 OIL | | NATURAL GAS | | → | | → | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test Number | 19-145 | | 19-146 | | 19-147 | | 19-149 | | 19-149 | |
| 2. Date | 21 FEB 77 | | 22 FEB 77 | | 22 FEB 77 | | → | | → | |
| 3. Time | 14:45 | | 08:30 | | 10:05 | | 10:40 | | 11:05 | |
| 4. Load | 14,000 | | 14,100 | | 14,100 | | 13,900 | | 14,600 | |
| 5. Test Purpose | OPACITY | | #2 BASELINE | | NATURAL GAS BASELINE | | FAN WIDE OPEN | | MED O2 | |
| 6. Excess $O_2$ Condition | SMOKE THRESHOLD | | NOM | | NOM | | HI | | MED | |
| 7. Cont. Room $O_2$ (%) | 1.9 | | 2.8 | | 2.8 | | 6.2 | | 1.6 | |
| 8. Pres.Furn/Windbox(iwg) | 0.48 | 1.3 | 0.38 | 1.7 | 0.48 | 2.2 | 0.96 | 3.8 | 5.40 | 2.2 |
| 9. Uptake (iwg) | -0.2 | | -0.21 | | -0.21 | | -0.15 | | -0.21 | |
| 10. Final Stm Press (psig) | 97 | | 95 | | 97 | | 95 | | 95 | |
| 11. Drum Press (psig) | 97 | | 95 | | 97 | | 95 | | 95 | |
| 12. F. Water P/T (psig/°F) | 215 | 222 | 216 | 222 | 207 | 222 | 208 | 222 | 217 | |
| 13. Air FD Fan Amps | 7.7 | | 8.2 | | 8.4 | | 11.0 | | 8.4 | |
| 14. Air Temp @ FD Fan/CR (°F) | 104 | | 86 | | 87 | | 85 | | 88 | |
| 15. Stack Temp (°F) | 521 | | 520 | | 538 | | 568 | | 531 | |
| 16. Fuel Flow (CFM or GPM) | 2.22 | | 2.14 | | | | | | | |
| 17. Fuel Pres/Temp (psi/°F) | 125 | 196 | 116 | 53 | 4.8 | | 4.75 | | 4.8 | |
| 18. Fuel Atom Pres (psig) | 34 | | 28 | | 88 IWG | | 88 | | 88 | |
| 19. Primary Reg. Setting | -8 | | -8 | | -8 | | -8 | | -8 | |
| 20. FGR Reg. Setting | C | | C | | C | | C | | C | |
| 21. ΔP Pitot FGR Duct (iwg) | — | | — | | 0.9 | | 0.1 | | — | |
| 22. ΔP Orif. FGR Duct (iwg) | — | | — | | 0.001 | | 0.001 | | — | |
| 23. Temp. FGR Duct (°F) | 131 | | — | | 104 | | 102 | | — | |
| 24. Pstat FGR Duct (psig) | — | | — | | 0.9 | | 1.4 | | — | |
| 25. Pstat S.A. Fan (psig) | 9.9 | | — | | 0 | | 0 | | — | |
| 26. Vortex FD Fan Blades | 0.53 | | 1.18 | | 1.33 | | 2.28 | | 1.19 | |
| 27. Vortex SA Fan Blades | 5.9 | | — | | — | | — | | — | |
| 28. SA Depth/Flow (ft/cfm) | 5 | | — | — | — | — | — | — | — | — |
| 29. % FGR | 0 | | 0 | | 0 | | 0 | | 0 | |
| 30. Total Oil Burned #2/#6 | — | — | — | | 0 | 0 | 0 | 0 | 0 | 0 |
| 31. Total Gas Burned | 0 | | 0 | | — | | — | | — | |

| | | | | | |
|---|---|---|---|---|---|
| ATOM AIR | | 23.1 | | | |
| STEAM VENT RATE | 7500 | 6000 | 8000 | 6000 | 7000 |
| DIFFUSER POS. | 2.9 | | 2.9 | 2.9 | 2.9 |

Data Sheet 6003-16

## UNIT OPERATING DATA

Test No.____ Date____ Location 19 Engr. SOTTER

Fuel N. GAS Atom.Type____ Capacity____

Test Comments____

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test Number | 19-150 | | 19-151 | | 19-152 | | 19-153 | | 19-154 | |
| 2. Date | 22 FEB 77 | | → | | → | | → | | → | |
| 3. Time | 11:25 | | 11:40 | | 13:30 | | 13:40 | | 13:45 | |
| 4. Load | 14,700 | | 14,500 | | 14,400 | | | | | |
| 5. Test Purpose | OPT $O_2$ | | HI CO | | HI Φ | | CHANGE: ONLY PROBE DEPTH | | → | |
| 6. Excess $O_2$ Condition | OPT | | MIN | | NOM | | | | | |
| 7. Cont. Room $O_2$ (%) | 0.9 | | 0.8 | | 2.4 | | | | | |
| 8. Pres.Furn/Windbox(iwg) | 0.36 | 2.0 | 0.36 | 2.0 | 0.54 | 1.9 | | | | |
| 9. Uptake (iwg) | -0.22 | | -0.22 | | -0.19 | | | | | |
| 10. Final Stm Press (psig) | 95 | | 95 | | 96 | | | | | |
| 11. Drum Press (psig) | 95 | | 95 | | 96 | | | | | |
| 12. F. Water P/T (psig/°F) | 217 | 222 | 217 | | 216 | | | | | |
| 13. Air FD Fan Amps | 8.2 | | 8.2 | | 7.6 | | | | | |
| 14. Air Temp @ FD Fan/CR (°F) | 88 | | 91 | | 101 | | | | | |
| 15. Stack Temp (°F) | 525 | | 523 | | 527 | | | | | |
| 16. Fuel Flow (CFM or GPM) | | | | | | | | | | |
| 17. Fuel Pres/Temp (psi/°F) | 4.8 | — | 4.8 | — | 4.8 | | | | | |
| 18. Fuel Atom Pres (psig) | 88 | | 88 | | 88 | | | | | |
| 19. Primary Reg. Setting | -8 | | -8 | | -8 | | | | | |
| 20. FGR Reg. Setting | C | | C | | C | | | | | |
| 21. ΔP Pitot FGR Duct (iwg) | — | | — | | — | | | | | |
| 22. ΔP Orif. FGR Duct (iwg) | — | | — | | — | | | | | |
| 23. Temp. FGR Duct (°F) | — | | — | | — | | | | | |
| 24. Pstat FGR Duct (psig) | — | | — | | — | | | | | |
| 25. Pstat S.A. Fan (psig) | — | | — | | 9.6 | | | | 10.8 | |
| 26. Vortex FD Fan Blades | 1.1 | | 1.1 | | 0.67 | | | | | |
| 27. Vortex SA Fan Blades | — | | — | | 5.2 | | | | 5.9 | |
| 28. SA Depth/Flow (ft/cfm) | — | — | — | — | 4 | | 5 | | 6 | |
| 29. % FGR | 0 | | 0 | | 0 | | | | | |
| 30. Total Oil Burned #2/#6 | 0 | 0 | 0 | 0 | 0 | 0 | | | | |
| 31. Total Gas Burned | — | | — | | — | | | | | |

Data Sheet 6003-16

| | | | |
|---|---|---|---|
| | 6500 | 6500 | 7500 |
| DIFFUSER POS. | 2.9 | 2.9 | 2.9 |

## UNIT OPERATING DATA

Test No.______ Date______ Location 19 Engr. SOT TFC

Fuel N. GAS Atom.Type______ Capacity______

Test Comments______

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test Number | 19-155 | | 19-156 | | 19-157 | | | | | |
| 2. Date | 22 FEB 77 | | → | | → | | | | | |
| 3. Time | 13:55 | | 14:15 | | 14:30 | | | | | |
| 4. Load | 14300 | | 14400 | | 14500 | | | | | |
| 5. Test Purpose | HI Φ | | HI Φ | | HI Φ | | | | | |
| 6. Excess $O_2$ Condition | NOM | | LO | | LO | | | | | |
| 7. Cont. Room $O_2$ (%) | 2.0 | | 1.2 | | 1.8 | | | | | |
| 8. Pres.Furn/Windbox(iwg) | 0.55 | 1.9 | 0.51 | 1.9 | 0.50 | 1.8 | | | | |
| 9. Uptake (iwg) | -0.20 | | -0.18 | | -0.19 | | | | | |
| 10. Final Stm Press (psig) | 96 | | 96 | | 96 | | | | | |
| 11. Drum Press (psig) | 95 | | 96 | | 96 | | | | | |
| 12. F. Water P/T (psig/°F) | 217 | | 217 | | 217 | | | | | |
| 13. Air FD Fan Amps | 7.9 | | 7.6 | | 7.9 | | | | | |
| 14. Air Temp @ FD Fan/CR (°F) | 98 | | 100 | | 102 | | | | | |
| 15. Stack Temp (°F) | 530 | | 524 | | 522 | | | | | |
| 16. Fuel Flow (CFM or GPM) | | | | | | | | | | |
| 17. Fuel Pres/Temp (psi/°F) | 4.8 | – | 4.8 | | 4.8 | | | | | |
| 18. Fuel Atom Pres PING ~~(psig)~~ | 88 | | 88 | | 88 | | | | | |
| 19. Primary Reg. Setting | -8 | | -8 | | -8 | | | | | |
| 20. FGR Reg. Setting | C | | C | | C | | | | | |
| 21. ΔP Pitot FGR Duct(iwg) | — | | — | | — | | | | | |
| 22. ΔP Orif. FGR Duct(iwg) | — | | — | | — | | | | | |
| 23. Temp. FGR Duct (°F) | — | | — | | — | | | | | |
| 24. Pstat FGR Duct (psig) | — | | — | | — | | | | | |
| 25. Pstat S.A. Fan (psig) | 9.7 | | 9.8 | | 9.7 | | | | | |
| 26. Vortex FD Fan Blades | 0.67 | | 0.61 | | 0.60 | | | | | |
| 27. Vortex SA Fan Blades | 5.8 | | 5.8 | | 5.2 | | | | | |
| 28. SA Depth/Flow (ft/cfm) | 7 | | 7 | | 4 | | | | | |
| 29. % FGR | 0 | | 0 | | 0 | | | | | |
| 30. Total Oil Burned #2/#6 | 0 | 0 | 0 | 0 | 0 | 0 | | | | |
| 31. Total Gas Burned | — | | — | | — | | | | | |

Data Sheet 6003-16

7500 7600 7800
2.9 2.9 2.9

## UNIT OPERATING DATA

Test No.

Date

Location 19

Engr. SOTTER

Fuel #6 OIL

Atom.Type AIR

Capacity

Test Comments

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test Number | 19-158 | | 19-159 | | → | | 19-160 | | 19-161 | |
| 2. Date | 23 FEB 77 | | → | | → | | → | | → | |
| 3. Time | 08:15 | | 09:40 | | 11:20 | | 14:10 | | 14:35 | |
| 4. Load | 14200 | | 14000 | | 13900 | | 14500 | | 14500 | |
| 5. Test Purpose | #6 BASELINE | | W/ SPECIFIC PARTIC | | W/ SPECIFIC IMPACTER | | MEO & MEO SPECIFIC | | → | |
| 6. Excess $O_2$ Condition | NOM | | NOM | | NOM | | NOM | | NOM | |
| 7. Cont. Room $O_2$ (%) | 2.3 | | 1.0 | | 1.0 | | 2.1 | | 2.2 | |
| 8. Pres.Furn/Windbox(iwg) | 0.40 | 1.75 | 0.80 | 3.5 | 0.85 | 3.5 | 0.83 | 3.0 | 0.96 | 3.1 |
| 9. Uptake (iwg) | -0.21 | | -0.19 | | -0.20 | | -0.17 | | -0.17 | |
| 10. Final Stm Press (psig) | 92 | | 94 | | 95 | | 95 | | 95 | |
| 11. Drum Press (psig) | 95 | | 96 | | 95 | | 95 | | 95 | |
| 12. F. Water P/T (psig/°F) | 193 | 205 | 212 | | 214 | 220 | 217 | 222 | 218 | 222 |
| 13. Air FD Fan Amps | 8.2 | | 8.5 | | | | 8.3 | | 8.4 | |
| 14. Air Temp @ FD Fan/CR(°F) | 85 | | 93 | | 99 | | 108 | | 107 | |
| 15. Stack Temp (°F) | 515 | | 562 | | 563 | | 578 | | 575 | |
| 16. Fuel Flow (CFM or GPM) | | | | | | | | | | |
| 17. Fuel Pres/Temp(psi/°F) | 131 | 192 | 130 | 192 | 129 | 192 | 130 | | 130 | 192 |
| 18. Fuel Atom Pres (psig) | 34 | | 34 | | 34 | | 34 | | 34 | |
| 19. Primary Reg. Setting | -8 | | -8 | | -8 | | -8 | | -8 | |
| 20. FGR Reg. Setting | C | | WIDE OPEN | | WIDE OPEN | | 3.3 | | 3.3 | |
| 21. ΔP Pitot FGR Duct(iwg) | — | | — | | — | | 0.15 | | 0.15 | |
| 22. ΔP Orif. FGR Duct(iwg) | — | | 0.75 | | — | | 0.39 | | 0.39 | |
| 23. Temp. FGR Duct (°F) | 110 | | 542 | | — | | 540 | | 537 | |
| 24. Pstat FGR Duct (psig) | — | | 4.5 | | — | | 5.0 | | 5.0 | |
| 25. Pstat S.A. Fan (psig) | — | | — | | — | | 10.5 | | 10.5 | |
| 26. Vortex FD Fan Blades | 1.2 | | ~1.2 | | 1.15 | | 0.92 | | 0.92 | |
| 27. Vortex SA Fan Blades | — | | — | | — | | 2.9 | | 3.2 | |
| 28. SA Depth/Flow (ft/cfm) | — | — | — | — | — | — | 4 | | 7 | |
| 29. % FGR | 0 | | 0 | | 0 | | | | | |
| 30. Total Oil Burned #2/#6 | — | — | — | — | | | — | — | — | — |
| 31. Total Gas Burned | 0 | | 0 | | | | 0 | | 0 | |
| | 25.1 | | 25.2 | | 25.2 | | 25.6 | | 25.6 | |
| | 5000 | | 7000 | | 7200 | | 8000 | | 8100 | |
| | 2.9 | | 2.9 | | 2.9 | | 2.9 | | 2.9 | |

Data Sheet 6003-16

## UNIT OPERATING DATA

Test No.______ Date______ Location 19 Engr. SOTTER

Fuel #6 + NG Atom.Type______ Capacity______

Test Comments______

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test Number | 19-162 | | 19-163 | | 19-164 | | 19-165 | | 19-166 | |
| 2. Date | 23 FEB 77 | | → | | 24 FEB 77 | | → | | → | |
| 3. Time | 15:00 | | 15:15 | | 08:05 | | 08:50 | | 09:10 | |
| 4. Load | 14,500 | | 14,500 | | 14,700 | | 13,500 | | 13,600 | |
| 5. Test Purpose | LO RECIRC MED φ | | → | | NG BASELINE | | MED φ | | → | |
| 6. Excess $O_2$ Condition | NOM | | NOM | | NOM | | NOM | | NOM | |
| 7. Cont. Room $O_2$ (%) | 2.2 | | 2.2 | | 2.9 | | 3.0 | | 2.9 | |
| 8. Pres.Furn/Windbox(iwg) | 0.88 | 2.8 | 0.86 | 2.7 | 0.48 | 2.4 | 0.50 | 2.0 | 0.48 | 2.0 |
| 9. Uptake (iwg) | -0.17 | | -0.16 | | -0.19 | | -0.18 | | -0.19 | |
| 10. Final Stm Press (psig) | 95 | | 95 | | 94 | | 96 | | 95 | |
| 11. Drum Press (psig) | 95 | | 95 | | 95 | | 96 | | 95 | |
| 12. F. Water P/T (psig/°F) | 218 | 222 | 219 | 222 | 193 | 222 | 203 | | 219 | 216 |
| 13. Air FD Fan Amps | 8.4 | | 8.5 | | 8.5 | | | | 7.9 | |
| 14. Air Temp @ FD Fan/CR(°F) | 166 | | 110 | | 88 | | 89 | | 89 | |
| 15. Stack Temp (°F) | 569 | | 564 | | 521 | | 521 | | 529 | |
| 16. Fuel Flow (CFM or GPM) | | | | | | | | | | |
| 17. Fuel Pres/Temp(psi/°F) | 130 | 192 | 130 | 192 | 4.75 PSIG | | 4.75 | | 4.75 | |
| 18. Fuel Atom Pres (psig) | 34 | | 34 | | 88 SWG | | 88 | | 88 | |
| 19. Primary Reg. Setting | -8 | | -8 | | -8 | | -8 | | -8 | |
| 20. FGR Reg. Setting | 3.2 | | 3.2 | | C | | C | | C | |
| 21. ΔP Pitot FGR Duct(iwg) | 0.15 | | 0.12 | | — | | — | | — | |
| 22. ΔP Orif. FGR Duct(iwg) | 0.20 | | 0.20 | | — | | — | | — | |
| 23. Temp. FGR Duct (°F) | 525 | | 525 | | — | | — | | — | |
| 24. Pstat FGR Duct (psig) | 5.5 | | 5.5 | | — | | — | | — | |
| 25. Pstat S.A. Fan (psig) | 10.5 | | 10.5 | | — | | 10.5 | | 10.6 | |
| 26. Vortex FD Fan Blades | 0.91 | | 0.89 | | 1.28 | | 0.84 | | 0.83 | |
| 27. Vortex SA Fan Blades | 3.2 | | 2.8 | | — | | 2.9 | | 3.4 | |
| 28. SA Depth/Flow (ft/cfm) | 7 | | 4' | | — | | 4' | | 7' | |
| 29. % FGR | | | | | 0 | | 0 | | 0 | |
| 30. Total Oil Burned #2/#6 | — | — | — | — | 0 | 0 | 0 | 0 | 0 | 0 |
| 31. Total Gas Burned | 0 | | 0 | | — | | — | | — | |

Data Sheet 6003-16

| | | | | |
|---|---|---|---|---|
| 25.3 | | | | |
| 8000 | 8100 | 6500 | 8000 | 8000 |
| 2.9 | 2.9 | 2.9 | 2.9 | 2.9 |

## UNIT OPERATING DATA

Test No.________ Date________ Location 19 Engr. SC77F2

Fuel NG Atom.Type ________ Capacity ________

Test Comments ________

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test Number | 19-167 | | 19-168 | | | | | | | |
| 2. Date | 24 FEB 77 | | → | | | | | | | |
| 3. Time | 09:45 | | 09:55 | | | | | | | |
| 4. Load | 13400 | | 13900 | | | | | | | |
| 5. Test Purpose | MED ϕ | | → | | | | | | | |
| 6. Excess $O_2$ Condition | LO | | LO | | | | | | | |
| 7. Cont. Room $O_2$ (%) | 1.4 | | 1.6 | | | | | | | |
| 8. Pres.Furn/Windbox(iwg) | 0.40 | 1.8 | 0.39 | 1.8 | | | | | | |
| 9. Uptake (iwg) | -0.19 | | -0.20 | | | | | | | |
| 10. Final Stm Press (psig) | 95 | | 95 | | | | | | | |
| 11. Drum Press (psig) | 95 | | 95 | | | | | | | |
| 12. F. Water P/T (psig/°F) | 217 | 220 | 215 | | | | | | | |
| 13. Air FD Fan Amps | 7.8 | | 7.7 | | | | | | | |
| 14. Air Temp @ FD Fan/CR (°F) | 88 | | 89 | | | | | | | |
| 15. Stack Temp (°F) | 521 | | 513 | | | | | | | |
| 16. Fuel Flow (CFM or GPM) | | | | | | | | | | |
| 17. Fuel Pres/Temp (psi/°F) | 4.75 | PSIG | 4.75 | | | | | | | |
| 18. Fuel Atom Pres (psig) | 88 IWG | | 88 | | | | | | | |
| 19. Primary Reg. Setting | -8 | | -8 | | | | | | | |
| 20. FGR Reg. Setting | C | | C | | | | | | | |
| 21. ΔP Pitot FGR Duct (iwg) | — | | — | | | | | | | |
| 22. ΔP Orif. FGR Duct (iwg) | — | | — | | | | | | | |
| 23. Temp. FGR Duct (°F) | — | | — | | | | | | | |
| 24. Pstat FGR Duct (psig) | — | | — | | | | | | | |
| 25. Pstat S.A. Fan (psig) | 10.5 | | 10.5 | | | | | | | |
| 26. Vortex FD Fan Blades | 0.68 | | 0.69 | | | | | | | |
| 27. Vortex SA Fan Blades | 3.2 | | 2.9 | | | | | | | |
| 28. SA Depth/Flow (ft/cfm) | 7 | | 4 | | | | | | | |
| 29. % FGR | 0 | | 0 | | | | | | | |
| 30. Total Oil Burned #2/#6 | 0 | 0 | 0 | 0 | | | | | | |
| 31. Total Gas Burned | — | | — | | | | | | | |

Data Sheet 6003-16

| | | |
|---|---|---|
| STEAM VENT RATE, LB/HR | 7500 | 7700 |
| DIFFUSER POS., IN. | 2.9 | 2.9 |

## UNIT OPERATING DATA

Test No.________ Date________ Location 19 Engr. SOTTER

Fuel #6 OIL Atom.Type AIR Capacity________

Test Comments________

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test Number | 19-169 | | 19-170 | | → | | → | | | |
| 2. Date | 1 MAR 77 | | → | | → | | → | | | |
| 3. Time | 09:00 | | 10:40 | | 12:10 | | 1:35 | | | |
| 4. Load | 14,200 | | 14,100 | | 14,400 | | 14,300 | | | |
| 5. Test Purpose | #6 BASELINE | | HI Φ<br>MAX RECIRC | | → | | → | | | |
| 6. Excess O2 Condition | NOM | | LO (MARGINAL STABILITY) | | → | | → | | | |
| 7. Cont. Room O2 (%) | 2.4 | | 4.0 | | 3.7 | | 3.7 | | | |
| 8. Pres.Furn/Windbox(iwg) | 0.43 | 1.9 | 1.03 | 3.4 | 1.03 | 3.4 | 1.04 | 3.4 | | |
| 9. Uptake (iwg) | -0.20 | | -0.15 | | -0.15 | | -0.15 | | | |
| 10. Final Stm Press (psig) | 98 | | 95 | | 94 | | 95 | | | |
| 11. Drum Press (psig) | 98 | | 95 | | 94 | | 94 | | | |
| 12. F. Water P/T (psig/°F) | 203 | 222 | 220 | 222 | 217 | 222 | 218 | 222 | | |
| 13. Air FD Fan Amps | — | | — | | — | | | | | |
| 14. Air Temp @ FD Fan/CR(°F) | 87 | | 107 | | 104 | | 105 | | | |
| 15. Stack Temp (°F) | 520 | | 567 | | 571 | | 570 | | | |
| 16. Fuel Flow (~~CFM or~~ GPM) | 2.21 | | 2.21 | | 2.20 | | 2.17 | | | |
| 17. Fuel Pres/Temp(psi/°F) | 127 | 194 | 125 | 196 | 126 | 195 | 124 | 196 | | |
| 18. Fuel Atom Pres (psig) | 33 | | 33 | | 33 | | 32 | | | |
| 19. Primary Reg. Setting | -8 | | -8 | | -8 | | -8 | | | |
| 20. FGR Reg. Setting | C | | WIDE OPEN | | WIDE OPEN | | WIDE OPEN | | | |
| 21. ΔP Pitot FGR Duct(iwg) | — | | 0.18 | | 0.17 | | -0.17 | | | |
| 22. ΔP Orif. FGR Duct(iwg) | — | | 0.78 | | 0.78 | | 0.78 | | | |
| 23. Temp. FGR Duct (°F) | — | | 544 | | 549 | | 550 | | | |
| 24. Pstat FGR Duct (psig) | — | | 4.4 | | 4.4 | | 4.4 | | | |
| 25. Pstat S.A. Fan (psig) | — | | 9.9 | | 10.0 | | 10.0 | | | |
| 26. Vortex FD Fan Blades | 1.23 | | 0.77 | | 0.78 | | 0.77 | | | |
| 27. Vortex SA Fan Blades | — | | 5.5 | | 5.6 | | 5.6 | | | |
| 28. SA Depth/Flow (ft/cfm) | — | — | 4 | | 4 | | 4 | | | |
| 29. % FGR | 0 | | | | | | | | | |
| 30. Total Oil Burned #2/#6 | — | — | — | — | — | — | — | — | | |
| 31. Total Gas Burned | 0 | | 0 | | 0 | | 0 | | | |

ATOM AIR PRESS, PSIG 24.9 24.5 24.5 24.3

10500 9400 6700 7300

DIFFUSER POS., IN. 2.9 2.9 2.9 2.9

Data Sheet 6003-16

## UNIT OPERATING DATA

Test No.________ Date________ Location 19 Engr. SOTTER

Fuel NAT. GAS Atom. Type GUN Capacity ________

Test Comments 32-ORIFACE GUN

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test Number | 19-171 | | 19-172 | | 19-173 | | 19-174 | | 19-175 | |
| 2. Date | 2 MAR 77 | | → | | → | | → | | → | |
| 3. Time | 11:15 | | 11:50 | | 13:30 | | 13:45 | | 14:50 | |
| 4. Load | 14,000 | | 14,260 | | 14,100 | | 14,300 | | 14,400 | |
| 5. Test Purpose | NGAS WITH MAX RECIRC | | GAS GUN BASELINE | | MED. RECIRC. | | LOW RECIRC | | LOW RECIRC | |
| 6. Excess $O_2$ Condition | NOM | | NOM | | NOM | | NOM | | LO | |
| 7. Cont. Room $O_2$ (%) | 3.2 | | 2.7 | | 3.0 | | 3.1 | | 1.6 | |
| 8. Pres.Furn/Windbox(iwg) | 0.81 | 5.0 | 0.45 | 3.8 | 1.69 | 4.35 | 0.59 | 4.0 | 0.58 | 3.8 |
| 9. Uptake (iwg) | -0.20 | | -0.20 | | -0.17 | | -0.18 | | -0.19 | |
| 10. Final Stm Press (psig) | 96 | | 95 | | 96 | | 96 | | 96 | |
| 11. Drum Press (psig) | 95 | | 94 | | 94 | | 95 | | 96 | |
| 12. F. Water P/T (psig/°F) | 214 | 222 | 215 | | 217 | 222 | 219 | 222 | 217 | 222 |
| 13. Air FD Fan Amps | | | | | | | | | | |
| 14. Air Temp @ FD Fan/CR(°F) | 93 | | 94 | | 100 | | 100 | | 103 | |
| 15. Stack Temp (°F) | 550 | | 519 | | 530 | | 522 | | 510 | |
| 16. Fuel Flow (CFM or GPM) | | | | | | | | | | |
| 17. Fuel Pres/Temp(psi/°F) | 4.5 | | 4.5 | | 4.5 | | 4.5 | | 4.75 | |
| 18. Fuel Atom Pres (~~psig~~ IWG) | 78 | | 78 | | 78 | | 78 | | 65 | |
| 19. Primary Reg. Setting | -4 | | -4 | | -4 | | -4 | | -4 | |
| 20. FGR Reg. Setting | WIDE OPEN | | C | | 3.3 | | 3.6 | | 3.6 | |
| 21. ΔP Pitot FGR Duct(iwg) | 0.1 | | — | | 0.1 | | 0.0 | | 0.0 | |
| 22. ΔP Orif. FGR Duct(iwg) | 0.55 | | -0.003 | | 0.139 | | 0.063 | | 0.058 | |
| 23. Temp. FGR Duct (°F) | 525 | | 300 | | 455 | | 450 | | 439 | |
| 24. Pstat FGR Duct (psig) | 4.65 | | 1.1 | | 5.4 | | 5.9 | | 5.3 | |
| 25. Pstat S.A. Fan (psig) | — | | — | | 0 | | 0 | | 0 | |
| 26. Vortex FD Fan Blades | 1.40 | | 1.37 | | 1.26 | | 1.28 | | 1.25 | |
| 27. Vortex SA Fan Blades | — | | — | | — | | — | | — | |
| 28. SA Depth/Flow (ft/cfm) | — | — | — | — | — | — | — | — | — | — |
| 29. % FGR | | | | | | | | | | |
| 30. Total Oil Burned #2/#6 | — | — | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 31. Total Gas Burned | — | | — | | — | | — | | — | |

| | | | | | |
|---|---|---|---|---|---|
| DIFFUSER POS., IN. | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 |
| STEAM VENT | 9200 | 7500 | 8000 | 8000 | 7800 |
| GUN POS., IN. | 18.7 | 18.7 | 18.7 | 18.7 | 18.7 |

Data Sheet 6003-16

## UNIT OPERATING DATA

Test No.__________ Date__________ Location 19 Engr. SOTTER

Fuel NAT. GAS +#2 Atom.Type GUN Capacity __________

Test Comments __________

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test Number | 19-176 | | 19-177 | | 19-178 | | 19-179 | | → | |
| 2. Date | 2 MAR 77 | | → | | 3 MAR 77 | | → | | → | |
| 3. Time | 15:25 | | 15:45 | | 08:15 | | 10:20 | | 11:20 | |
| 4. Load | 14,800 | | 15000 | | 14,400 | | 13,600 | | 13,700 | |
| 5. Test Purpose | MED RECIRC | | HI RECIRC | | #2 BASELINE | | MAX RECIRC<br>MAX & PARTICS | | | |
| 6. Excess $O_2$ Condition | LO | | LO - STABLE LIMIT | | NOM | | LO STABILITY LIMIT | | → | |
| 7. Cont. Room $O_2$ (%) | 1.7 | | 1.1 | | 2.1 | | 2.9 | | 2.9 | |
| 8. Pres.Furn/Windbox(iwg) | 0.89 | 5.1 | 0.98 | 5.2 | 0.46 | 2.0 | 0.96 | 3.2 | 0.96 | 3.2 |
| 9. Uptake (iwg) | -0.16 | | -0.18 | | -0.20 | | -0.19 | | -0.19 | |
| 10. Final Stm Press (psig) | 95 | | 95 | | 100 | | 96 | | 96 | |
| 11. Drum Press (psig) | 94 | | 95 | | 100 | | 96 | | 96 | |
| 12. F. Water P/T (psig/°F) | 215 | 222 | 216 | 222 | 218 | 222 | 219 | 222 | 218 | 222 |
| 13. Air FD Fan Amps | — | | — | | — | | — | | — | |
| 14. Air Temp @ FD Fan/CR (°F) | 104 | | 102 | | 87 | | 108 | | 109 | |
| 15. Stack Temp (°F) | 541 | | 557 | | 519 | | 556 | | 556 | |
| 16. Fuel Flow (CFM or GPM) | | | | | | | | | | |
| 17. Fuel Pres/Temp (psi/°F) | 4.7 | | 4.7 | | 112 | | 113 | 56 | 113 | 56 |
| 18. Fuel Atom Pres (psig) | 68 | | 68 | | 29 | | 28 | | 28 | |
| 19. Primary Reg. Setting | -4 | | -4 | | -8 | | -8 | | -8 | |
| 20. FGR Reg. Setting | 3.4 | | 1.25 | | C | | WIDE OPEN | | WIDE OPEN | |
| 21. ΔP Pitot FGR Duct(iwg) | 0.0 | | 0.05 | | — | | 0.1 | | 0.1 | |
| 22. ΔP Orif. FGR Duct(iwg) | 0.115 | | 0.49 | | — | | 0.80 | | 0.81 | |
| 23. Temp. FGR Duct (°F) | 480 | | 525 | | — | | 540 | | 540 | |
| 24. Pstat FGR Duct (psig) | 5.3 | | 4.3 | | — | | 4.4 | | 4.4 | |
| 25. Pstat S.A. Fan (psig) | — | | — | | — | | 10.1 | | 10.0 | |
| 26. Vortex FD Fan Blades | 1.65 | | 1.46 | | 1.32 | | 0.69 | | 0.68 | |
| 27. Vortex SA Fan Blades | — | | — | | — | | 5.6 | | 5.6 | |
| 28. SA Depth/Flow (ft/cfm) | — | — | — | — | — | — | 4 | | 4 | |
| 29. % FGR | | | | | | | | | | |
| 30. Total Oil Burned #2/#6 | 0 | 0 | 0 | 0 | 0 | 0 | — | — | — | — |
| 31. Total Gas Burned | — | | — | | — | | 0 | | 0 | |
| | 6.6 | | 6.6 | | ATOM AIR 24.1 | | 23.9 | | 23.9 | |
| | 8000 | | 8100 | | 10,000 | | 9500 | | 8000 | |
| | 18.7 | | 18.7 | | 2.9 | | 3.9 | | 3.9 | |

Data Sheet 6003-16

## UNIT OPERATING DATA

Test No.________ Date________ Location 19 Engr. SOTTER

Fuel #2 OIL Atom.Type________ Capacity________

Test Comments________

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test Number | 19-179 | | → | | | | | | | |
| 2. Date | 3 MAR 77 | | → | | | | | | | |
| 3. Time | 13:45 | | 14:45 | | | | | | | |
| 4. Load | 14,300 | | 14,000 | | | | | | | |
| 5. Test Purpose | IMPACTOR | | → | | | | | | | |
| 6. Excess O<sub></sub>2 Condition | STABILITY LIMIT | | → | | | | | | | |
| 7. Cont. Room O2 (%) | 2-6 | | 2-8 | | | | | | | |
| 8. Pres.Furn/Windbox(iwg) | 1.00 | 3.2 | 1.00 | 3.2 | | | | | | |
| 9. Uptake (iwg) | -0.17 | | -0.17 | | | | | | | |
| 10. Final Stm Press (psig) | 98 | | 98 | | | | | | | |
| 11. Drum Press (psig) | 95 | | 95 | | | | | | | |
| 12. F. Water P/T (psig/°F) | 220 | 222 | 220 | 222 | | | | | | |
| 13. Air FD Fan Amps | — | | — | | | | | | | |
| 14. Air Temp @ FD Fan/CR(°F) | 116 | | >116 | | | | | | | |
| 15. Stack Temp (°F) | 554 | | 552 | | | | | | | |
| 16. Fuel Flow (CFM or GPM) | | | | | | | | | | |
| 17. Fuel Pres/Temp(psi/°F) | 113 | 60 | 113 | 60 | | | | | | |
| 18. Fuel Atom Pres (psig) | 28 | | 28 | | | | | | | |
| 19. Primary Reg. Setting | -8 | | -8 | | | | | | | |
| 20. FGR Reg. Setting | WIDE OPEN | | WIDE OPEN | | | | | | | |
| 21. ΔP Pitot FGR Duct(iwg) | 0.1 | | 0.1 | | | | | | | |
| 22. ΔP Orif. FGR Duct(iwg) | 0.75 | | 0.73 | | | | | | | |
| 23. Temp. FGR Duct (°F) | 537 | | 535 | | | | | | | |
| 24. Pstat FGR Duct (psig) | 4.4 | | 4.4 | | | | | | | |
| 25. Pstat S.A. Fan (psig) | 9.8 | | 9.8 | | | | | | | |
| 26. Vortex FD Fan Blades | 0.68 | | 0.67 | | | | | | | |
| 27. Vortex SA Fan Blades | 5.5 | | 5.5 | | | | | | | |
| 28. SA Depth/Flow (ft/cfm) | 4 | | 4 | | | | | | | |
| 29. % FGR | | | | | | | | | | |
| 30. Total Oil Burned #2/#6 | — | — | — | — | | | | | | |
| 31. Total Gas Burned | 0 | | 0 | | | | | | | |

| | | |
|---|---|---|
| | | 23.9 |
| | 7500 | 7500 |
| DIFFUSER POS., IN | 3.9 | 3.9 |

Data Sheet 6003-16

## UNIT OPERATING DATA

Test No.________ Date________ Location 19 Engr. SOTTER

Fuel NAT. GAS Atom.Type GUN Capacity________

Test Comments________

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test Number | 19-180 | | 19-181 | | 19-182 | | 19-183 | | 19-184 | |
| 2. Date | 4 MAR 77 | | → | | → | | → | | → | |
| 3. Time | 08:00 | | 09:00 | | 09:35 | | 09:50 | | 10:00 | |
| 4. Load | 6700 | | 13,800 | | 14,000 | | 14,000 | | 13 900 | |
| 5. Test Purpose | LOW LOAD | | GAS GUN BASELINE | | MAX $O_2$ | | LO $O_2$ | | MIN $O_2$ | |
| 6. Excess $O_2$ Condition | AS FOUND | | NOM | | MAX | | LO | | HI CO | |
| 7. Cont. Room $O_2$ (%) | 4.8 | | 2.6 | | 5.0 | | 2.0 | | 1.0 | |
| 8. Pres.Furn/Windbox(iwg) | 0.00 | 1.65 | 0.40 | 3.9 | 0.68 | 5.5 | 0.32 | 3.4 | 0.28 | 3.1 |
| 9. Uptake (iwg) | -0.22 | | -0.20 | | -0.19 | | -0.20 | | -0.21 | |
| 10. Final Stm Press (psig) | 94 | | 97 | | 97 | | 97 | | 99 | |
| 11. Drum Press (psig) | 92 | | 98 | | 97 | | 98 | | 98 | |
| 12. F. Water P/T (psig/°F) | 225 | 222 | 214 | 222 | 212 | 222 | 213 | 222 | 214 | |
| 13. Air FD Fan Amps | — | | — | | — | | — | | — | |
| 14. Air Temp @ FD Fan/CR(°F) | 84 | | 82 | | 84 | | 85 | | 84 | |
| 15. Stack Temp (°F) | 391 | | 508 | | 522 | | 496 | | 489 | |
| 16. Fuel Flow (CFM or GPM) | | | | | | | | | | |
| 17. Fuel Pres/Temp(psi/°F) | 5.6 | | 4.5 | | 4.5 | | 4.5 | | 4.5 | |
| 18. Fuel Atom Pres (~~psig~~ IWG) | 25 | | 81 | | 79 | | 79 | | 79 | |
| 19. Primary Reg. Setting | -3 | | -4 | | -4 | | -4 | | -4 | |
| 20. FGR Reg. Setting | C | | C | | C | | C | | C | |
| 21. ΔP Pitot FGR Duct(iwg) | — | | — | | — | | — | | — | |
| 22. ΔP Orif. FGR Duct(iwg) | — | | — | | — | | — | | — | |
| 23. Temp. FGR Duct (°F) | — | | — | | — | | — | | — | |
| 24. Pstat FGR Duct (psig) | — | | — | | — | | — | | — | |
| 25. Pstat S.A. Fan (psig) | — | | — | | — | | — | | — | |
| 26. Vortex FD Fan Blades | 0.43 | | 1.40 | | 1.92 | | 1.20 | | — | |
| 27. Vortex SA Fan Blades | — | | — | | — | | — | | — | |
| 28. SA Depth/Flow (ft/cfm) | — | — | — | — | — | — | — | — | — | — |
| 29. % FGR | 0 | | 0 | | 0 | | 0 | | 0 | |
| 30. Total Oil Burned #2/#6 | — | — | — | — | — | — | — | — | — | — |
| 31. Total Gas Burned | — | | — | | — | | — | | — | |

| | | | | | |
|---|---|---|---|---|---|
| | | | 6.5 | 6.5 | 6.5 |
| STEAM VENT | 0 | 9500 | 9100 | 9100 | 10,000 |
| | | | 18 | 18.6 | 18.6 |

Data Sheet 6003-16

UNIT OPERATING DATA

Test No._______ Date_______ Location 19 Engr. SOTTER

Fuel NAT. GAS Atom.Type GUN Capacity _______

Test Comments _______

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test Number | 19-185 | | 19-186 | | 19-187 | | 19-188 | | 19-189 | |
| 2. Date | 4 MAR 77 | | → | | → | | → | | → | |
| 3. Time | 10:45 | | 11:00 | | 13:50 | | 14:05 | | 14:25 | |
| 4. Load | 14,000 | | 14,000 | | 14,000 | | 13,700 | | 13,800 | |
| 5. Test Purpose | MAX Φ | | → | | MAX Φ<br>HI RECIRC | | → | | MAX Φ<br>MED RECIRC | |
| 6. Excess O₂ Condition | NOM | | → | | STABLE<br>LIMIT | | → | | CO LIM | |
| 7. Cont. Room O₂ (%) | 2.0 | | 1.7 | | 3.9 | | 3.5 | | 2.4 | |
| 8. Pres.Furn/Windbox(iwg) | 0.43 | 2.5 | 0.43 | 2.5 | 1.00 | 4.7 | 0.99 | 4.7 | 0.74 | 4.2 |
| 9. Uptake (iwg) | -0.20 | | -0.20 | | -0.17 | | -0.18 | | -0.18 | |
| 10. Final Stm Press (psig) | 97 | | 97 | | 98 | | 95 | | 95 | |
| 11. Drum Press (psig) | 97 | | 97 | | 97 | | 94 | | 95 | |
| 12. F. Water P/T (psig/°F) | 216 | 222 | 218 | 222 | 221 | 221 | 220 | | 220 | |
| 13. Air FD Fan Amps | — | | — | | — | | — | | — | |
| 14. Air Temp @ FD Fan/CR(°F) | 90 | | 89 | | 101 | | 103 | | 101 | |
| 15. Stack Temp (°F) | 497 | | 501 | | 531 | | 530 | | 510 | |
| 16. Fuel Flow (CFM or GPM) | | | | | | | | | | |
| 17. Fuel Pres/Temp(psi/°F) | 4.5 | | 4.5 | | 4.5 | | 4.5 | | 4.5 | |
| 18. Fuel Atom Pres (psig) | 80 | | 80 | | 77 | | 77 | | 78 | |
| 19. Primary Reg. Setting | -4 | | -4 | | -3 | | -3 | | -3 | |
| 20. FGR Reg. Setting | C | | C | | 2.1 | | 2.1 | | | |
| 21. ΔP Pitot FGR Duct(iwg) | — | | — | | 0.08 | | 0.09 | | — | |
| 22. ΔP Orif. FGR Duct(iwg) | — | | — | | 0.48 | | 0.50 | | 0.14 | |
| 23. Temp. FGR Duct (°F) | — | | — | | 504 | | 504 | | 440 | |
| 24. Pstat FGR Duct (psig) | — | | — | | 6.7 | | 4.8 | | 5.7 | |
| 25. Pstat S.A. Fan (psig) | 10.0 | | 10.0 | | 9.8 | | 9.9 | | 9.9 | |
| 26. Vortex FD Fan Blades | 0.62 | | 0.62 | | 0.91 | | 0.91 | | 0.81 | |
| 27. Vortex SA Fan Blades | 5.4 | | 6.0 | | 5.6 | | 6.1 | | 6.1 | |
| 28. SA Depth/Flow (ft/cfm) | 4 | | 7 | | 4 | | 7 | | 7 | |
| 29. % FGR | 0 | | 0 | | | | | | | |
| 30. Total Oil Burned #2/#6 | — | — | — | — | — | — | — | — | — | — |
| 31. Total Gas Burned | | | | | | | | | | |
| | 6.5<br>9500<br>18.6 | | 6.5<br>9500<br>18.6 | | 6.5<br>7000<br>18.6 | | 6.5<br>6000<br>18.6 | | 6.5<br>6900<br>18.6 | |

Data Sheet 6003-16

## UNIT OPERATING DATA

Test No.________ Date________ Location 19 Engr. SETTER

Fuel NAT. GAS + #6 OIL Atom.Type________ Capacity________

Test Comments________

| | GAS | | GAS | | #6 | | #6 | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test Number | 19-190 | | → | | 19-191 | | 19-192 | | → | |
| 2. Date | 7 MAR 77 | | 7 MAR 77 | | → | | → | | → | |
| 3. Time | 09:45 | | 1102 | | 13:35 | | 15:25 | | 1621 | |
| 4. Load | 13700 | | 14000 | | 14500 | | 14300 | | 14400 | |
| 5. Test Purpose | HI RECIRC PARTICS | | HI RECIRC PART. + SOx | | #6 BASELINE | | REPEAT 190 FOR SOx | | → | |
| 6. Excess O2 Condition | NOM | | NOM | | NOM | | MIN STABLE | | → | |
| 7. Cont. Room O2 (%) | 3.0 | | 2.9 | | 1.6 | | 3.0 | | 4.0 | |
| 8. Pres.Furn/Windbox(iwg) | 0.70 | 4.8 | 0.73 | 4.8 | 0.40 | 1.8 | 1.03 | 3.5 | 1.04 | 3.5 |
| 9. Uptake (iwg) | -0.22 | | -.19 | | -0.19 | | -0.16 | | -0.18 | |
| 10. Final Stm Press (psig) | 95 | | 95 | | 95 | | 95 | | 95 | |
| 11. Drum Press (psig) | 95 | | 90 | | 96 | | 96 | | 96 | |
| 12. F. Water P/T (psig/°F) | 215 | | 216 | 223 | 218 | 222 | 220 | 222 | 219 | |
| 13. Air FD Fan Amps | — | | — | | — | | — | | — | |
| 14. Air Temp @ FD Fan/CR (°F) | 87 | | 95 | | 86 | | 105 | | 111 | |
| 15. Stack Temp (°F) | 538 | | 540 | | 508 | | 560 | | 558 | |
| 16. Fuel Flow (CFM or GPM) | | | | | | | | | | |
| 17. Fuel Pres/Temp (psi/°F) | 4.75 | | 4.75 | | 129 | 190 | 129 | 190 | 128 | 191 |
| 18. Fuel Atom Pres ~~(psig)~~ iwg | 64 | | 64 | | 33 | | 33 | | 33 | |
| 19. Primary Reg. Setting | -4 | | -4 | | -8 | | -8 | | -8 | |
| 20. FGR Reg. Setting | 3.0 | | 3.0 | | C | | WIDE OPEN | (0.75) | 0.75 | |
| 21. ΔP Pitot FGR Duct (iwg) | 0.05 | | 0.07 | | — | | — | | 0.05 | |
| 22. ΔP Orif. FGR Duct (iwg) | 0.27 | | 0.27 | | — | | 0.72 | | 0.72 | |
| 23. Temp. FGR Duct (°F) | 504 | | 504 | | 117 | | 541 | | 549 | |
| 24. Pstat FGR Duct (psig) | 5.3 | | 5.25 | | -0.15 | | 4.4 | | 4.4 | |
| 25. Pstat S.A. Fan (psig) | 0 | | 0 | | — | | 10.0 | | 9.8 | |
| 26. Vortex FD Fan Blades | 1.50 | | 1.50 | | 1.23 | | 0.81 | | 0.81 | |
| 27. Vortex SA Fan Blades | — | | — | | — | | 5.7 | | 5.6 | |
| 28. SA Depth/Flow (ft/cfm) | — | — | — | — | — | — | 4 | | 4 | |
| 29. % FGR | | | — | | 0 | | | | | |
| 30. Total Oil Burned #2/#6 | 0 | 0 | — | — | — | — | | | | |
| 31. Total Gas Burned | — | | — | | 0 | | 0 | | 0 | |
| DIFFUSER POSITION, IN. | 6.4 | | 6.4 | | 2.9 | | 2.9 | | 2.9 | |
| STEAM VENT RATE, LB/HR | 7000 | | 6500 | | 7600 | | 7000 | | 7000 | |
| GAS GUN POSITION, IN. | 18.6 | | 18.6 | | — | | — | | | |

Data Sheet 6003-16

## UNIT OPERATING DATA

Test No.______ Date______ Location 19 Engr. SOTTFR BUENING

Fuel NAT. GAS Atom.Type GUN Capacity ______

Test Comments ______

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test Number | 19-193 | | SAME | | SAME | | SAME | | | |
| 2. Date | 3-8-77 | | 3-8-77 | | 3-8-77 | | 3-8-77 | | | |
| 3. Time | 9:25 | | 10:25 | | 11:25 | | 12:20 | | | |
| 4. Load | 14,400 | | 14,100 | | 14,200 | | 14,500 | | | |
| 5. Test Purpose | BASELINE GAS GUN PART. | | SAME | | SAME | | SAME | | | |
| 6. Excess $O_2$ Condition | NORMAL + SOX | | SAME | | SAME | | SAME | | | |
| 7. Cont. Room $O_2$ (%) | 3.5 | | 3.5 | | 3.5 | | 3.5 | | | |
| 8. Pres.Furn/Windbox(iwg) | 0.42 | 2.8 | .41 | 2.8 | .43 | 2.81 | .43 | 2.8 | | |
| 9. Uptake (iwg) | -.21 | | -.2 | | -0.2 | | -.2 | | | |
| 10. Final Stm Press (psig) | 96 | — | 99 | — | 96 | — | 96 | — | | |
| 11. Drum Press (psig) | 96 | | 98 | | 96 | | 95 | | | |
| 12. F. Water P/T (psig/°F) | 219 | 220 | 211 | 216 | 218 | 220 | 219 | 220 | | |
| 13. Air FD Fan Amps | N.A. | | — | | — | | — | | | |
| 14. Air Temp @ FD Fan/CR (°F) | 87 | 74 | 87 | 75 | 86 | 76 | 86 | 78 | | |
| 15. Stack Temp (°F) | 512 | | 515 | | 512 | | 513 | | | |
| 16. Fuel Flow (CFM or GPM) | | | | | | | | | | |
| 17. Fuel Pres/Temp (psi/°F) | 4.75 | — | 4.75 | — | 4.75 | — | 4.75 | | | |
| 18. Fuel Atom Pres IWG (~~psig~~) | 64 | | 64 | | 64 | | 65 | | | |
| 19. Primary Reg. Setting | -5 | — | -5 | — | -5 | — | -5 | — | | |
| 20. FGR Reg. Setting | CLOSED | | CLOSED | | CLOSED | | CLOSED | | | |
| 21. ΔP Pitot FGR Duct (iwg) | CL. | | CL. | | CLOS. | | CLOSED | | | |
| 22. ΔP Orif. FGR Duct (iwg) | — | | — | | — | | — | | | |
| 23. Temp. FGR Duct (°F) | — | | — | | 108 | | 118 | | | |
| 24. Pstat FGR Duct (psig) | — | | — | | — | | — | | | |
| 25. Pstat S.A. Fan (psig) | — | | — | | — | | — | | | |
| 26. Vortex FD Fan Blades | 1.4 "$H_2O$ | | 1.4 | | 1.4 | | 1.38 | | | |
| 27. Vortex SA Fan Blades | — | | — | | — | | — | | | |
| 28. SA Depth/Flow (ft/cfm) | — | — | — | — | — | — | — | — | | |
| 29. % FGR | — | | — | | — | | — | | | |
| 30. Total Oil Burned #2/#6 | — | — | — | — | — | — | — | — | | |
| 31. Total Gas Burned | — | | — | | — | | — | | | |
| DIFFUSER POS., IN. | 6 ½ | | 6 ½ | | 6 ½ | | 6 ½ | | | |
| STEAM VENT RATE, LB/HR | 7000 | | 10,000 | | 8,200 | | 7,300 | | | |
| GUN POS., IN. | 18 ½ | | 18½ | | 18½ | | 18½ | | | |

Data Sheet 6003-16

## UNIT OPERATING DATA

Test No. 19-1 SASS Date 3-10-77 Location 19 Engr. K.

Fuel #6 Oil Atom.Type Air Capacity 17.5

Test Comments

| | #6 | | #6 | | #6 | | #6 | | #6 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test Number | 19-1 SASS | | — | | — | | — | | → | |
| 2. Date | 3-10-77 | | 3-10-77 | | — | | — | | → | |
| 3. Time | 11:20 | | 12:00 | | 13:00 | | 14:00 | | 15:10 | |
| 4. Load | 14.3 | | 14.3 | | 14.3 | | 14.4 | | 14.4 | |
| 5. Test Purpose | SASS-Basel. | | — | | — | | — | | → | |
| 6. Excess $O_2$ Condition | Normal | | — | | — | | — | | → | |
| 7. Cont. Room $O_2$ (%) | 2.2 | | 2.1 | | 2.4 | | 2.1 | | 2.0 | |
| 8. Drum Press (psig) | 96 | | 96 | | 96 | | 96 | | 97 | |
| 9. Final Stm Press (psig) | 96 | - | 96 | - | 96 | - | 96 | - | 97 | — |
| 10. F. Water P/T (psig/°F) | 219 | 220 | 218 | 220 | 219 | 221 | 219 | 220 | 219 | 220 |
| 11. Air FD Fan Amps | — | | — | | [illegible] | | — | | — | |
| 12. Air Temp@FD Fan/CR(°F) | 89 | 83 | 94 | 86 | 88 | 87 | 95 | 92 | 97 | 94 |
| 13. Stack Temp (°F) | 511 | | 511 | | 512 | | 513 | | 514 | |
| 14. Fuel Flow (~~CFH~~ or GPM) | 53s/2Gal. | | 55s/2Gal. | | 55.5/2Gal. | | 55s/2Gal. | | 55s/2Gal. | |
| 15. Fuel Pres/Temp(psi/°F) | 129 | 193 | 129 | 193 | 129 | 194 | 129 | 195 | 129 | 195 |
| 16. Fuel Atom Pres (psig) | 32.5 | | 32.3 | | 32.5 | | 32.5 | | 32.5 | |
| 17. Pres.Furn/Windbox(iwg) | .42 | 1.8 | .45 | 1.78 | .47 | 1.8 | .47 | 1.8 | .5 | 1.8 |
| 18. Primary Reg. Setting | -8 | - | -8 | - | -8 | - | -8 | - | -8 | - |
| 19. FGR Reg. Setting | - | - | - | - | - | - | - | - | - | - |
| 20. Uptake (iwg) | -.18 | | -.18 | | -.18 | | -.16 | | -.16 | |
| 21. ΔP Pitot FGR Duct(iwg) | — | | — | | — | | — | | — | |
| 22. ΔP Orif. FGR Duct(iwg) | — | | — | | — | | — | | — | |
| 23. Temp. FGR Duct (°F) | 118 | | 119 | | 114 | | 121 | | 124 | |
| 24. Pstat FGR Duct (~~psig~~ "$H_2O$) | .45 | | .5 | | .55 | | .5 | | .5 | |
| 25. Pstat S.A. Fan (psig) | — | | — | | — | | — | | — | |
| 26. Vortex FD Fan Blades | 1.15 | | 1.12 | | 1.16 | | 1.15 | | 1.15 | |
| 27. Vortex SA Fan Blades | — | | — | | — | | — | | — | |
| 28. SA Depth/Flow (ft/cfm) | - | - | - | - | - | - | - | - | - | - |
| 29. % FGR | 0 | | 0 | | 0 | | | | 0 | |
| 30. Total Oil Burned #2/#6 | - | - | - | - | - | - | - | - | - | - |
| 31. Total Gas Burned | - | | - | | - | | - | | - | |
| Diffuser Position, in | 2.9 | | 2.9 | | 2.9 | | 2.9 | | 2.9 | |
| Steam Vent rate | 10.3 | | 10.4 | | 10.5 | | 10.6 | | 10.6 | |
| Oil Gun position, in | — | | — | | — | | — | | - | |

Data Sheet 6003-15

## UNIT OPERATING DATA

Test No. 19-1 SASS Date 3-10-77 Location 19 Engr. K.

Fuel #6 Oil Atom.Type Air Capacity 17.5

Test Comments

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Test Number | 19-1 SASS | | | | | |
| 2. Date | 3-10-77 | | | | | |
| 3. Time | 16:00 | | | | | |
| 4. Load | 14.2 | | | | | |
| 5. Test Purpose | SASS Test | | | | | |
| 6. Excess $O_2$ Condition | Baseline<br>Normal | | | | | |
| 7. Cont. Room $O_2$ (%) | 2.2 | | | | | |
| 8. Drum Press (psig) | 97 | | | | | |
| 9. Final Stm Press (psig) | 97 | — | | | | |
| 10. F. Water P/T (psig/°F) | 219 | 220 | | | | |
| 11. Air FD Fan Amps | Over span | | | | | |
| 12. Air Temp@FD Fan/CR(°F) | 90 | 90 | | | | |
| 13. Stack Temp (°F) | 518 | | | | | |
| 14. Fuel Flow (~~CPM~~ or GPM) | 55.5s/2gal. | | | | | |
| 15. Fuel Pres/Temp(psi/°F) | 129 | 195 | | | | |
| 16. Fuel Atom Pres (psig ) | 32.5 | | | | | |
| 17. Pres.Furn/Windbox(iwg) | .5 | 1.81 | | | | |
| 18. Primary Reg. Setting | -8 | — | | | | |
| 19. FGR Reg. Setting | — | — | | | | |
| 20. Uptake (iwg) | -.165 | | | | | |
| 21. ΔP Pitot FGR Duct(iwg) | — | | | | | |
| 22. ΔP Orif. FGR Duct(iwg) | — | | | | | |
| 23. Temp. FGR Duct (°F) | 119 | | | | | |
| 24. Pstat FGR Duct "$H_2O$ (~~psig~~) | 5 | | | | | |
| 25. Pstat S.A. Fan (psig) | — | | | | | |
| 26. Vortex FD Fan Blades | 1.13 | | | | | |
| 27. Vortex SA Fan Blades | — | | | | | |
| 28. SA Depth/Flow (ft/cfm) | — | — | | | | |
| 29. % FGR | 0 | | | | | |
| 30. Total Oil Burned #2/#6 | — | — | | | | |
| 31. Total Gas Burned | — | | | | | |
| Diffuser Position, in | 2.9 | | | | | |
| Steam vent rate | 10.5 | | | | | |

Data Sheet 6003-16

## UNIT OPERATING DATA

Test No. 19-2 SASS Date 3-17 77 Location 19 Engr. B.

Fuel #6 Atom.Type Air Atom. Capacity 17.5 K

Test Comments Baseline SASS Test

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test Number | 19-2 SASS | → | | | | | | | | |
| 2. Date | 3-17-77 | → | | | | | | | | |
| 3. Time | 10:00 | | 11:00 | | 12:00 | | 13:00 | | 14:00 | |
| 4. Load | 13.8 | | 14.6 | | 14.8 | | 14.9 | | 14.7 | |
| 5. Test Purpose | SASS Test | → | | | | | | | | |
| 6. Excess $O_2$ Condition | normal | → | | | | | | | | |
| 7. Cont. Room $O_2$ (%) | 2.6 | | 2.3 | | 1.8 | | 2.0 | | 2.1 | |
| 8. Drum Press (psig) | 98 | | 97 | | 97 | | 97 | | 97 | |
| 9. Final Stm Press (psig) | 98 | – | 97 | – | 97 | – | 97 | – | 97 | – |
| 10. F. Water P/T (psig/°F) | 220 | 214 | 219 | 215 | 220 | 215 | 219 | 222 | 220 | 220 |
| 11. Air FD Fan Amps | – | | – | | – | | – | | – | |
| 12. Air Temp@FD Fan/CR(°F) | 92 | 82 | 91 | 82 | 93 | 85 | 100 | 90 | 99 | 89 |
| 13. Stack Temp (°F) | 518 | | 517 | | 512 | | 519 | | 518 | |
| 14. Fuel Flow (CFM or GPM) | 53s/2Gal. | | 53s/2Gal. | | 53s/2Gal. | | 52.8s/2Gal. | | 51.6s/2Gal. | |
| 15. Fuel Pres/Temp(psi/°F) | 131 | 212 | 135 | 212 | 136 | 211 | 135 | 212 | 132 | 212 |
| 16. Fuel Atom Pres (psig) | 35 | | 35 | | 35.5 | | 35 | | 34.5 | |
| 17. Pres.Furn/Windbox(iwg) | .49 | 2.25 | .49 | 2.25 | .5 | 2.3 | .5 | 2.25 | .5 | 2.25 |
| 18. Primary Reg. Setting | -6 | – | -6 | – | -6 | – | -6 | – | -6 | – |
| 19. FGR Reg. Setting | – | – | – | – | – | – | – | – | – | – |
| 20. Uptake (iwg) | -.18 | | -.18 | | -.18 | | -.16 | | -.17 | |
| 21. ΔP Pitot FGR Duct(iwg) | – | | – | | – | | – | | – | |
| 22. ΔP Orif. FGR Duct(iwg) | – | | – | | – | | – | | – | |
| 23. Temp. FGR Duct (°F) | 114 | | 115 | | 117 | | 121 | | 122 | |
| 24. Pstat FGR Duct ("$H_2O$ ~~psig~~) | .7 | | .7 | | .7 | | .7 | | .75 | |
| 25. Pstat S.A. Fan (psig) | – | | – | | – | | – | | – | |
| 26. Vortex FD Fan Blades "$H_2O$ | 1.28 | | 1.27 | | 1.26 | | 1.25 | | 1.22 | |
| 27. Vortex SA Fan Blades | – | | – | | – | | – | | – | |
| 28. SA Depth/Flow (ft/cfm) | – | – | – | – | – | – | – | – | – | – |
| 29. % FGR | 0 | | 0 | | 0 | | 0 | | 0 | |
| 30. Total Oil Burned #2/#6 | – | – | – | – | – | – | – | – | – | – |
| 31. Total Gas Burned | – | | – | | – | | – | | – | |
| Diffuser Posit. in | 2⅞" | | 2⅞" | | 2⅞" | | 2⅞ | | 2⅞ | |
| Steam Vent Rate | 12.9 | | 10.3 | | 10.4 | | 10.4 | | 10.3 | |

Data Sheet 6003-16

## UNIT OPERATING DATA

Test No. 19-2 SASS Date 3-17-77 Location 19 Engr. K.

Fuel #6 Atom.Type Air Capacity 17.5

Test Comments Baseline SASS Test

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Test Number | 19-2 SASS | | | | | |
| 2. Date | 3-17-77 | | | | | |
| 3. Time | 15:00 | | | | | |
| 4. Load | 14.7 | | | | | |
| 5. Test Purpose | SASS-Test | | | | | |
| 6. Excess $O_2$ Condition | normal | | | | | |
| 7. Cont. Room $O_2$ (%) | 2.4 | | | | | |
| 8. Drum Press (psig) | 97 | | | | | |
| 9. Final Stm Press (psig) | 97 | – | | | | |
| 10. F. Water P/T (psig/°F) | 219 | 220 | | | | |
| 11. Air FD Fan Amps | – | | | | | |
| 12. Air Temp@FD Fan/CR(°F) | 90 | 89 | | | | |
| 13. Stack Temp (°F) | 518 | | | | | |
| 14. Fuel Flow (CFM or GPM) | 54.86/260l. | | | | | |
| 15. Fuel Pres/Temp(psi/°F) | 132 | 212 | | | | |
| 16. Fuel Atom Pres (Psig) | 34.5 | | | | | |
| 17. Pres.Furn/Windbox(iwg) | .52 | 2.3 | | | | |
| 18. Primary Reg. Setting | -6 | – | | | | |
| 19. FGR Reg. Setting | – | – | | | | |
| 20. Uptake (iwg) | -.18 | | | | | |
| 21. ΔP Pitot FGR Duct(iwg) | – | | | | | |
| 22. ΔP Orif. FGR Duct(iwg) | – | | | | | |
| 23. Temp. FGR Duct (°F) | 119 | | | | | |
| 24. Pstat FGR Duct (~~psig~~ "H2O) | .75 | | | | | |
| 25. Pstat S.A. Fan (psig) | – | | | | | |
| 26. Vortex FD Fan Blades | 1.25 | | | | | |
| 27. Vortex SA Fan Blades | – | | | | | |
| 28. SA Depth/Flow (ft/cfm) | – | – | | | | |
| 29. % FGR | 0 | | | | | |
| 30. Total Oil Burned #2/#6 | – | – | | | | |
| 31. Total Gas Burned | – | | | | | |
| Diffuser Posit. " | 2 7/8 | | | | | |
| Steam Vent Rate | 10.3 | | | | | |

Data Sheet 6003-16

## UNIT OPERATING DATA

Test No. 19-3 SASS Date 3-21-77 Location 19 Engr. K.

Fuel #6 Atom.Type Air Capacity 175

Test Comments SASS Test with Hi Recirc. & low air

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test Number | 19-3 SASS | | | | | | | | → | |
| 2. Date | 3-21-77 | | | | | | | | → | |
| 3. Time | 10:30 | | 11:30 | | 12:30 | | 13:30 | | 14:30 | |
| 4. Load | 14.2 | | 14.5 | | 14.4 | | 14.4 | | 14.4 | |
| 5. Test Purpose | SASS | | | | | | | | → | |
| 6. Excess $O_2$ Condition | low | | | | | | | | → | |
| 7. Cont. Room $O_2$ (%) | 1.1 | | 1.0 | | 1.1 | | .9 | | .8 | |
| 8. Drum Press (psig) | 96 | | 96 | | 96 | | 97 | | 97 | |
| 9. Final Stm Press (psig) | 96 | - | 96 | - | 96 | - | 97 | - | 97 | - |
| 10. F. Water P/T (psig/°F) | 215 | 220 | 220 | 220 | 220 | 220 | 221 | 220 | 221 | 220 |
| 11. Air FD Fan Amps | - | | - | | - | | - | | - | |
| 12. Air Temp@FD Fan/CR(°F) | 99 | 82 | 100 | 84 | 99 | 84 | 100 | 86 | 102 | 88 |
| 13. Stack Temp (°F) | 550 | | 551 | | 551 | | 551 | | 551 | |
| 14. Fuel Flow (GPM or GPM) | 52.55/2Gal. | | 52.9/2Gal. | | 53.6/2Gal. | | 52.5/2Gal. | | 53.5/2Gal. | |
| 15. Fuel Pres/Temp(psi/°F) | 125 | 222 | 126 | 220 | 123 | 216 | 125 | 223 | 124 | 221 |
| 16. Fuel Atom Pres (psig) | 33.5 | | 33.5 | | 33.5 | | 33.5 | | 33.5 | |
| 17. Pres.Furn/Windbox(iwg) | .8 | 3.55 | .84 | 3.6 | .84 | 3.6 | .86 | 3.6 | .85 | 3.55 |
| 18. Primary Reg. Setting | -8 | - | -8 | - | -8 | - | -8 | - | -8 | - |
| 19. FGR Reg. Setting | 100% | open | | | | | | | | → |
| 20. Uptake (iwg) | -.19 | | -.2 | | -.19 | | -.195 | | -.195 | |
| 21. ΔP Pitot FGR Duct(iwg) | .1 | | .1 | | .1 | | .1 | | .1 | |
| 22. ΔP Orif. FGR Duct(iwg) | .72 | | .72 | | .72 | | .72 | | .71 | |
| 23. Temp. FGR Duct (°F) | 541 | | 541 | | 539 | | 540 | | 540 | |
| 24. Pstat FGR Duct (~~psig~~ "$H_2O$) | 4.5 | | 4.5 | | 4.5 | | 4.45 | | 4.4 | |
| 25. Pstat S.A. Fan (psig) | - | | - | | - | | - | | - | |
| 26. Vortex FD Fan Blades | 1.1 | | 1.1 | | 1.11 | | 1.1 | | 1.1 | |
| 27. Vortex SA Fan Blades | - | | - | | - | | - | | - | |
| 28. SA Depth/Flow (ft/cfm) | - | - | - | - | - | - | - | - | - | - |
| 29. % FGR | - | | - | | - | | - | | - | |
| 30. Total Oil Burned #2/#6 | - | - | - | - | - | - | - | - | - | - |
| 31. Total Gas Burned | - | | - | | - | | - | | - | |
| Steam vent Rate | 9.5 | | 8.5 | | 9.2 | | 10.2 | | 10.1 | |
| Atom. Air Press. | 25.3 | | 25.1 | | 25 | | 25.3 | | 25.2 | |
| Diffuser Posit. | 2 7/8" | | 2 7/8" | | 2 7/8" | | 2 7/8" | | 2 7/8" | |

Data Sheet 6003-16

UNIT OPERATING DATA

Test No. 19-3 SASS Date 3-21-77 Location 19 Engr. Kc

Fuel #6 Atom.Type Air Capacity 17.5

Test Comments SASS Test with Hi Recirc. & Low Air

| | | | Baseline | | | | |
|---|---|---|---|---|---|---|---|
| 1. Test Number | 19-3 SASS | | 19-3 SASS | | | | |
| 2. Date | 3-21-77 | | 3-21-77 | | | | |
| 3. Time | 15:30 | | 15:50 | | | | |
| 4. Load | 14.4 | | 14.5 | | | | |
| 5. Test Purpose | SASS Test | | Baseline | | | | |
| 6. Excess $O_2$ Condition | Low | | normal | | | | |
| 7. Cont. Room $O_2$ (%) | .9 | | 1.9 | | | | |
| 8. Drum Press (psig) | 97 | | 97 | | | | |
| 9. Final Stm Press (psig) | 97 | - | 97 | | | | |
| 10. F. Water P/T (psig/°F) | 221 | 220 | 221 | 220 | | | |
| 11. Air FD Fan Amps | — | | — | | | | |
| 12. Air Temp@FD Fan/CR(°F) | 100 | 89 | 98 | 89 | | | |
| 13. Stack Temp (°F) | 550 | | 518 | | | | |
| 14. Fuel Flow (CFH or GPM) | 54s/2Gal | | 54/2Gal. | | | | |
| 15. Fuel Pres/Temp(psi/°F) | 124 | 221 | 124 | 221 | | | |
| 16. Fuel Atom Pres (psig) | 33 | | 33 | | | | |
| 17. Pres.Furn/Windbox(iwg) | .855 | 3.6 | .5 | 1.9 | | | |
| 18. Primary Reg. Setting | -8 | - | -8 | - | | | |
| 19. FGR Reg. Setting | 100% | open | - | - | | | |
| 20. Uptake (iwg) | -.18 | | -.18 | | | | |
| 21. ΔP Pitot FGR Duct(iwg) | .1 | | — | | | | |
| 22. ΔP Orif. FGR Duct(iwg) | .72 | | — | | | | |
| 23. Temp. FGR Duct (°F) | 536 | | — | | | | |
| 24. Pstat FGR Duct (psig) | 4.4 | | .55 | | | | |
| 25. Pstat S.A. Fan (psig) | - | | - | | | | |
| 26. Vortex FD Fan Blades | 1.11 | | 1.2 | | | | |
| 27. Vortex SA Fan Blades | - | | - | | | | |
| 28. SA Depth/Flow (ft/cfm) | - | - | - | - | | | |
| 29. % FGR | - | | 8 | | | | |
| 30. Total Oil Burned #2/#6 | - | - | - | - | | | |
| 31. Total Gas Burned | - | | - | | | | |
| Steam Vent Rate | 10.2 | | 10.2 | | | | |
| Atom. Air Press. | 25.2 | | 25.1 | | | | |
| Diffuser Pos. | 2 7/8" | | 2 7/8" | | | | |

Data Sheet 6003-16

## UNIT OPERATING DATA

Test No. 19-4 SASS Date 3-23-77 Location 19 Engr. Vn

Fuel #6 Atom.Type Air Capacity 17.5

Test Comments SASS Test with Hi Recirc & low Air

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test Number | 19-4 SASS | | → | | | | | | | |
| 2. Date | 3-23-77 | | → | | | | | | | |
| 3. Time | 9:30 | | 10:30 | | 11:40 | | 12:30 | | 13:30 | |
| 4. Load | 14.0 | | 14.1 | | 14.2 | | 14.0 | | 14.1 | |
| 5. Test Purpose | SASS Test | | → | | | | | | | |
| 6. Excess $O_2$ Condition | low | | → | | | | | | | |
| 7. Cont. Room $O_2$ (%) | .9 | | .8 | | .6 | | .9 | | .8 | |
| 8. Drum Press (psig) | 96 | | 96 | | 96 | | 97 | | 97 | |
| 9. Final Stm Press (psig) | 96 | — | 96 | — | 96 | — | 97 | — | 97 | — |
| 10. F. Water P/T (psig/°F) | 218 | 220 | 217 | 220 | 220 | 220 | 221 | 220 | 221 | 220 |
| 11. Air FD Fan Amps | — | | — | | — | | — | | — | |
| 12. Air Temp@FD Fan/CR(°F) | 92 | 76 | 94 | 78 | 96 | 81 | 98 | 84 | 98 | 84 |
| 13. Stack Temp (°F) | 547 | | 548 | | 548 | | 548 | | 548 | |
| 14. Fuel Flow (~~GPM~~ or ~~GPH~~) | 52.5/2 Gal. | | 53.6/2Gal | | 54.9/2 Gal | | 54.9/2 Gal. | | 55/2 Gal | |
| 15. Fuel Pres/Temp(psi/°F) | 127 | 221 | 128 | 221 | 123 | 221 | 123 | 222 | 123 | 221 |
| 16. Fuel Atom Pres (psig) | 34 | | 34.5 | | 34 | | 33.5 | | 33.5 | |
| 17. Pres.Furn/Windbox(iwg) | .72 | 3.4 | .75 | 3.4 | .75 | 3.4 | .8 | 3.4 | .8 | 3.4 |
| 18. Primary Reg. Setting | -8 | — | -8 | — | -8 | — | -8 | — | -8 | — |
| 19. FGR Reg. Setting | 100% | open | → | → | | | | | | |
| 20. Uptake (iwg) | -.19 | | -.2 | | -.2 | | -.16 | | -.18 | |
| 21. ΔP Pitot FGR Duct(iwg) | .1 | | .1 | | .1 | | .1 | | .1 | |
| 22. ΔP Orif. FGR Duct(iwg) | .74 | | .74 | | .74 | | .75 | | .75 | |
| 23. Temp. FGR Duct (°F) | 537 | | 538 | | 539 | | 538 | | 536 | |
| 24. Pstat FGR Duct ("$H_2O$ ~~psig~~) | 4.35 | | 4.4 | | 4.35 | | 4.4 | | 4.35 | |
| 25. Pstat S.A. Fan (psig) | — | | — | | — | | — | | — | |
| 26. Vortex FD Fan Blades | 1.05 | | 1.05 | | 1.03 | | 1.0 | | 1.03 | |
| 27. Vortex SA Fan Blades | — | | — | | — | | — | | — | |
| 28. SA Depth/Flow (ft/cfm) | — | — | — | — | — | — | — | — | — | — |
| 29. % FGR | — | | — | | — | | — | | — | |
| 30. Total Oil Burned #2/#6 | — | — | — | — | — | — | — | — | — | — |
| 31. Total Gas Burned | — | | — | | — | | — | | — | |
| Diffuser position " | 2 7/8 | | 2 7/8 | | 2 7/8 | | 2 7/8 | | 2 7/8 | |
| Air Atom. press psig | 26.8 | | 26.9 | | 26.8 | | 26.5 | | 26.2 | |
| Steam vented | 6.0 | | 8.5 | | 9.0 | | 8.7 | | 9.9 | |

Data Sheet 6003-16

## UNIT OPERATING DATA

Test No. 19-4SASS Date 3-23-77 Location 19 Engr. K.

Fuel #6 Atom.Type Air Capacity 17.5

Test Comments SASS Test. Hi Recirc. Low Air

| | | | Baseline | | | | |
|---|---|---|---|---|---|---|---|
| 1. Test Number | 19-4SASS | | 19-4SASS | | | | |
| 2. Date | 3-23-77 | | 3-23-77 | | | | |
| 3. Time | 14:50 | | 15:05 | | | | |
| 4. Load | 14.4 | | 14.2 | | | | |
| 5. Test Purpose | SASS Test | | Baseline | | | | |
| 6. Excess $O_2$ Condition | low | | normal | | | | |
| 7. Cont. Room $O_2$ (%) | .8 | | 2.1 | | | | |
| 8. Drum Press (psig) | 97 | | 97 | | | | |
| 9. Final Stm Press (psig) | 97 | - | 97 | - | | | |
| 10. F. Water P/T (psig/°F) | 221 | 220 | 221 | 220 | | | |
| 11. Air FD Fan Amps | - | | - | | | | |
| 12. Air Temp@FD Fan/CR(°F) | 98 | 86 | 90 | 84 | | | |
| 13. Stack Temp (°F) | 548 | | 518 | | | | |
| 14. Fuel Flow (CFM or GPM) | 55.8/2Gal. | | 53.4/2Gal. | | | | |
| 15. Fuel Pres/Temp(psi/°F) | 124 | 222 | 126 | 221 | | | |
| 16. Fuel Atom Pres (psig) | 33.5 | | 33.5 | | | | |
| 17. Pres.Furn/Windbox(iwg) | .81 | 3.45 | .5 | 1.8 | | | |
| 18. Primary Reg. Setting | -8 | - | | - | | | |
| 19. FGR Reg. Setting | 100% | open | closed | | | | |
| 20. Uptake (iwg) | -.2 | | -.19 | | | | |
| 21. ΔP Pitot FGR Duct(iwg) | .1 | | - | | | | |
| 22. ΔP Orif. FGR Duct(iwg) | .75 | | - | | | | |
| 23. Temp. FGR Duct (°F) | 540 | | - | | | | |
| 24. Pstat FGR Duct (psig) | 4.35 | | .6 | | | | |
| 25. Pstat S.A. Fan (psig) | - | | - | | | | |
| 26. Vortex FD Fan Blades | 1.01 | | 1.1 | | | | |
| 27. Vortex SA Fan Blades | - | | - | | | | |
| 28. SA Depth/Flow (ft/cfm) | - | - | - | - | | | |
| 29. % FGR | - | | 0 | | | | |
| 30. Total Oil Burned #2/#6 | - | - | - | - | | | |
| 31. Total Gas Burned | - | | - | | | | |
| Diffuser Pos. | 2 7/8" | | 2 7/8" | | | | |
| Air Atom. Press. psig | 26.1 | | 25.9 | | | | |
| steam vented | 9.4 | | 9.3 | | | | |

Data Sheet 6003-16

## LOCATION 19

## FUEL GAS CHROMATOGRAPHIC ANALYSIS

Test 19-190

March 7, 1977

| | |
|---|---|
| Oxygen | < 0.009% by volume |
| Nitrogen | 0.29 |
| Carbon Dioxide | 0.54 |
| Methane | 95.84 |
| C 2 | 2.92 |
| C 3 | 0.22 |
| C 4 | 0.099 |
| C 5 | 0.039 |
| C 6 plus | 0.054 |
| Heating Value | 1035 BTU/SCF (dry) |

| Fuel<br>Date<br>Laboratory No. | #2 Oil<br>1/6/77<br>13520 | #2 Oil<br>1/10/77<br>13520 | #2 Oil<br>1/19/77<br>14009 | #6 Oil<br>12/15/76<br>13042 | #6 Oil<br>1/19/77<br>14009 | #6 Oil<br>2/16/77<br>14667 | #6 Oil<br>3/2/77<br>14667 | #6 Oil<br>3/10/77<br>16554 | #6 Oil<br>3/17/77<br>16554 | #6 Oil<br>3/21/77<br>16554 | #6 Oil<br>3/23/77<br>16554 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Carbon, % | 86.45 | 85.62 | 86.49 | 87.55 | 86.91 | 87.55 | 87.30 | 87.23 | 86.06 | 86.25 | 86.55 |
| Hydrogen, % | 13.01 | 12.99 | 13.17 | 11.49 | 11.78 | 11.40 | 11.34 | 11.34 | 11.11 | 11.25 | 11.26 |
| Nitrogen, % | <0.001 | <0.001 | 0.008 | 0.20 | 0.20 | 0.23 | 0.22 | 0.23 | 0.32 | 0.32 | 0.30 |
| Sulfur, % | 0.16 | 0.10 | 0.14 | 0.56 | 0.54 | 0.60 | 0.60 | 0.55 | 1.17 | 1.18 | 1.02 |
| Ash, % | <0.001 | <0.001 | 0.001 | 0.020 | 0.019 | 0.034 | 0.026 | 0.027 | 0.025 | 0.024 | 0.025 |
| Oxygen, % | 0.38 | 1.09 | 0.19 | 0.18 | 0.55 | 0.19 | 0.51 | 0.62 | 1.32 | 0.98 | 0.85 |
| API Gravity | 37.8 | 37.7 | 37.5 | 20.7 | 20.7 | 17.0 | 17.3 | 17.5 | 14.3 | 15.7 | 15.8 |
| HHV, Btu/lb | 19,680 | 19,680 | 19,610 | 18,910 | 19,000 | 18,780 | 18,850 | 18,850 | 18,670 | 18,740 | 18,750 |
| HHV, kJ/kg | 45,775 | 45,775 | 45,613 | 43,984 | 44,194 | 43,682 | 43,845 | 43,845 | 43,426 | 43,589 | 43,613 |

PLANT
LOCATION 19
OPERATOR G. SOTTER
DATE 1-6-77
RUN NO. 19-5
SAMPLE BOX NO.
METER BOX NO.
METER H
C FACTOR @

Method 5

METHOD 5 CONTROL CONSOLE READINGS

SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE 10°F
BAROMETRIC PRESSURE 30.25
ASSUMED MOISTURE, %
HEATER BOX SETTING
PROBE LENGTH, IN.
NOZZLE DIAMETER, IN. 1/2
PROBE HEATER SETTING

| Traverse Point Number | Sampling Time (e) Min. | Static Pressure ($P_s$), In. Hg. | Stack Temperature ($T_s$) °F | Velocity Head ($P_s$) | Pressure Differential Across Orifice Meter ($\Delta H$), In. $H_2O$ | Gas Sample Volume ($V_m$) $ft^3$ | Gas Sample Temperature at Dry Gas Meter | | Sample Box Temperature °F | Temperature of Gas Leaving Condenser on Last Impinger °F |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Inlet ($T_{min.}$) °F | Outlet ($T_{mout}$) °F | | |
| | 0935 | | 470 | .086 | 1.45 | 2210.00 | | 70 | 370 | 50 |
| | 0950 | | 475 | .086 | 1.45 | 2223.00 | | 75 | 365 | 58 |
| | 1005 | | 475 | .086 | 1.45 | 2235.50 | | 85 | 360 | 75 |
| | 1020 | | 480 | .086 | 1.45 | 2249.00 | | 90 | 365 | 60 |
| | 1035 | | 480 | .086 | 1.45 | 2261.50 | | 95 | 365 | 60 |
| | 1048 | | 480 | .086 | 1.45 | 2272.00 | | 100 | 365 | 62 |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | 73 min | | | | | | | | | |
| TOTAL | | | 477 | .086 | | 6200 | | AVG. | AVG. | |
| AVERAGE | | | | | | | | AVG. | | |

## PARTICULATE CALCULATION SHEET

Test Crew R. PIONESSA
Test No. 14-5 Date 1-6-76 Location 19
Box No. 1 Sample Probe Position CENTER
Test Description BASELINE #2 OIL, Method 5

Dry Gas Meter Vol. ($ft^3$)
Final 2272.00
Initial 2210.00
Total 62.00

Impinger Water Vol (ml)

| | 1 | 2 | 3 | S. Gel | Total |
|---|---|---|---|---|---|
| Final | 180 | 149 | 2 | 681.2 | 1012.2 |
| Initial | 100 | 100 | 0 | 659.0 | 859.0 |
| Δ Vol | 80 | 49 | 2 | 22.2 | 153.2 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Beaker No. | | 1 | 3 | 4 | H2O BLANK<br>5 | ACETONE BLANK<br>6 | Filter No. 13 | Blank No. 14 |
| Date Weighed | | 1/5/77 | → | → | → | → | 1/5/77 | 1/5/77 |
| Tare Wt. | 1 | 100.0785 | 101.9848 | 99.2665 | 98.9340 | 100.4849 | .8529 | .8452 |
| | 2 | 100.0782 | 101.9847 | 99.2663 | 98.9338 | 100.4849 | .8529 | .8454 |
| | 3 | | | | | | | |
| | 4 | | | | | | | |
| | 5 | | | | | | | |
| | 6 | | | | | | | |
| | Avg | 100.0784 | 101.9848 | 99.2664 | 98.9339 | 100.4849 | .8529 | .8453 |
| Bottle No. | | | | | | | | |
| Content | | Impinger (Water) | Probe (Acetone) | Probe (Water) | Cyclone (Acetone) | Flask (Dry) | | |
| Rinse (ml) | | 735 | 485 | 310 | 200 | 200 | | |
| Date Weighed or 250 Bake | | 1/18/77 | → | → | → | → | 1/18/77 | → |
| Final Wt. 250 | 1 | 100.1992 | 101.9914 | 99.2727 | 98.9373 | 100.4889 | .8698 | .8452 |
| | 2 | 100.1994 | 101.9919 | 99.2724 | 98.9371 | 100.4884 | .8699 | .8453 |
| | 3 | | | | | | | |
| | 4 | | | | | | | |
| | 5 | | | | | | | |
| | 6 | | | | | | | |
| | Avg | 100.1993 | 101.9917 | 99.2726 | 98.9372 | 100.4887 | .8694 | .8453 |
| Residue wt Final 250-Tare | | .1209 | .0069 | .0062 | .0033 | .0038 | .0170 | 0 |
| Date Weighed or 650 Bake | | | | | | | | |
| Final Wt. 650 | 1 | | | | | | | |
| | 2 | | | | | | | |
| | 3 | | | | | | | |
| | 4 | | | | | | | |
| | 5 | | | | | | | |
| | 6 | | | | | | | |
| | Avg | | | | | | | |
| Residue Wt Final 650-Tare | | | | | | | | |

Comments:

Data Sheet 6002-3

## TOTAL PARTICULATE EMISSION CALCULATIONS

Test No. 19-5 Date 1/6/77 Location 19 Engr. G. SOTTEL

Unit No. 1 Fuel #2 OIL Sampling Train and Method EPA Method 5

Pitot Factor, Fs .83 Barometric Pressure, $P_{bar}$ 30.25 in. Hg

Tot. Liquid Collected, $V_{1c}$ 153.2 ml Total Particulate, $M_n$ 147.6 m gm

Velocity Head, ΔP .086 iwg Stack Temp., Ts 937 °R Stack Area, As 4.9 $ft^2$

Sample Volume, Vm 62.0 $ft^3$ Stack Press., Psg -.2 iwg Excess $O_2$, $XO_2$% 3.2 %

Orifice Press. Diff., H 1.45 iwg Stack Gas Sp. Gravity, Gs 1.00 n.d.

Sample Time, θ 73 min Nozzle Dia., Dn 1/2 in. Meter Temp., $T_m$ 546 °R

| | | | | |
|---|---|---|---|---|
| *1. Sample Gas Volume | | $Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$ | 62.86 | SCF |
| 2. Water Vapor | | $Vw_{std} = 0.0474\ V_{1c}$ | 7.26 | SCF |
| 3. Moisture Content | | Bwo = Eq. 2/(Eq. 1 + Eq. 2) | 0.104 | N.D. |
| 4. Concentration | a. | $C = 0.0154\ Mn/Vm_{std}$ | .0362 | grains/DSCF |
| | b. | $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$ | $5.178 \times 10^{-6}$ | lb/DSCF |
| | c. | $C = \text{Eq. 4b} \times 16.018 \times 10^3$ | $8.293 \times 10^{-2}$ | grams/DSCM |
| 5. Abs. Stack Press. | | $Ps = P_{bar} \times 13.6 + Psg$ | 411.8 | in. w abs. |
| 6. Stack Gas Speed | | $Vs = 174\ Fs \sqrt{\Delta PTs} \sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$ | 1288 | ft/min |
| 7. Stack Gas Flow Rate @ 70°F | a. | $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$ | 3612 | WSCF/min |
| | b. | Qsd = Eq. 7a x (1. - Eq. 3) | 3236 | DSCF/min |
| 8. Material Flow | | Ms = Eq. 7b x Eq. 4b x 60 | 1.005 | lb/hr |
| 9. $XO_2$ factor | | $XO_2f = 2090/(20.9 - XO_2\%)$ | 118.1 | N.D. |
| 10. Emission | a. | E = Eq. 4b x Fe x Eq. 9 | $5.638 \times 10^{-2}$ | lb/MMBtu |
| | b. | E = Eq. 4c x Fm x Eq. 9 x 1000 | 24.24 | ng/joule |
| 11. % Isokinetic | | $I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$ | 95.6 | % |

| | Oil | Gas | Coal |
|---|---|---|---|
| Fe SC Feet/$10^4$ Btu | 92.2 | 87.4 | 98.2 |
| Fm SC Meters/$10^4$ joules | 0.002475 | 0.002346 | 0.002636 |

*Multiply $Vm_{std}$ by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

# SOLID PARTICULATE EMISSION CALCULATIONS

Test No. 19-5 Date 1-6-77 Location ________ Engr. G SOTTER

Unit No. 1 Fuel #2 OIL Sampling Train and Method ________

Pitot Factor, Fs 0.83 Barometric Pressure, $P_{bar}$ 30.25 in. Hg

Tot. Liquid Collected, $V_{1c}$ 153.2 ml ~~Total~~ SOLID Particulate, $M_n$ 15.8 m gm

Velocity Head, ΔP .086 iwg Stack Temp., Ts 937 °R Stack Area, As 4.90 $ft^2$

Sample Volume, Vm 62.0 $ft^3$ Stack Press., Psg -.2 iwg Excess $O_2$, $XO_2$% 3.2 %

Orifice Press. Diff., H 1.45 iwg Stack Gas Sp. Gravity, Gs 1.0 n.d.

Sample Time, θ 73 min Nozzle Dia., Dn 1/2 in. Meter Temp., $T_m$ 546 °R

| | | | | |
|---|---|---|---|---|
| *1. | Sample Gas Volume | $Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$ | 62.86 | SCF |
| 2. | Water Vapor | $Vw_{std} = 0.0474\ V_{1c}$ | 7.26 | SCF |
| 3. | Moisture Content | Bwo = Eq. 2/(Eq. 1 + Eq. 2) | 0.104 | N.D. |
| 4. | Concentration | a. $C = 0.0154\ Mn/Vm_{std}$ | 0.00387 | grains/DSCF |
| | | b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$ | $5.542 \times 10^{-7}$ | lb/DSCF |
| | | c. $C = \text{Eq. 4b} \times 16.018 \times 10^{3}$ | $8.878 \times 10^{-3}$ | grams/DSCM |
| 5. | Abs. Stack Press. | $Ps = P_{bar} \times 13.6 + Psg$ | 411.8 | in. w abs. |
| 6. | Stack Gas Speed | $Vs = 174\ Fs \sqrt{\Delta PTs} \sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$ | 1288 | ft/min |
| 7. | Stack Gas Flow Rate @ 70°F | a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$ | 3612 | WSCF/min |
| | | b. Qsd = Eq. 7a x (1. - Eq. 3) | 3236 | DSCF/min |
| 8. | Material Flow | Ms = Eq. 7b x Eq. 4b x 60 | $1.076 \times 10^{-1}$ | lb/hr |
| 9. | $XO_2$ factor | $XO_2f = 2090/(20.9 - XO_2\%)$ | 118.1 | N.D. |
| 10. | Emission | a. E = Eq. 4b x Fe x Eq. 9 | $6.03 \times 10^{-3}$ | lb/MMBtu |
| | | b. E = Eq. 4c x Fm x Eq. 9 x 1000 | 2.595 | ng/joule |
| 11. | % Isokinetic | $I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$ | 95.6 | % |

| | Oil | Gas | Coal |
|---|---|---|---|
| Fe SC Feet/$10^4$ Btu | 92.2 | 87.4 | 98.2 |
| Fm SC Meters/$10^4$ joules | 0.002475 | 0.002346 | 0.002636 |

*Multiply $Vm_{std}$ by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

PLANT
LOCATION 19
OPERATOR
DATE 1/6/77
RUN NO. 19- 7
SAMPLE BOX NO. NA
METER BOX NO. 11-1091
METER H
C FACTOR @

N0.20:1

METHOD 5 CONTROL CONSOLE READINGS

AMBIENT TEMPERATURE 26°F
BAROMETRIC PRESSURE 30.06 in. Hg
ASSUMED MOISTURE, %
HEATER BOX SETTING
PROBE LENGTH, IN.
NOZZLE DIAMETER, IN. 3/8
PROBE HEATER SETTING

BASE LINE

FINAL METER 2302.14
START 2272.14
30.00

ANDERSON CASCADE IMPACTOR

SCHEMATIC OF STACK CROSS SECTION

| Traverse Point Number | Sampling Time ~~(e)~~ Min. | Static Pressure $(P_s)$, ~~In. Hg.~~ iwg | Stack Temperature $(T_s)$ °F | Velocity Head $(P_s)$ iwg | Pressure Differential Across Orifice Meter $(\Delta H)$, In. $H_2O$ | Gas Sample Volume Meter Reading ~~$(V_m)$ ft$^3$~~ | Gas Sample Temperature at Dry Gas Meter Inlet $(T_{min.})$ °F | Gas Sample Temperature at Dry Gas Meter Outlet $(T_{mout})$ °F | Sample Box Temprtature °F | Temperature of Gas Leaving Condenser on Last Impinger °F |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1520 | -0.2 | 475 | 0.086 | 0.65 | 2272.14 | 85 | NA | NA | NA |
| | 1530 | | | | | 2278.24 | 90 | | | |
| | 1540 | | | | | 2284.40 | 90 | | | |
| | 1550 | | | | | 2290.30 | 95 | | | |
| | 1600 | | | | | 2295.60 | 100 | | | |
| | 1610 | | | | | 2301.00 | 103 | | | |
| | 1612:20 | ↓ | ↓ | ↓ | ↓ | 2302.14 | | ↓ | ↓ | ↓ |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| TOTAL | | | | | | | | AVG. | AVG. | |
| AVERAGE | | | | | | | | AVG. | | |

1-6-77

## ANDERSEN CASCADE IMPACTOR DATA

Test No. 19-7 Location 19 Owner

Impactor No. 1 Nozzle Size 3/8 Filter No. 1

Stack Temperature 475 °F Impactor Flow Rate 0.577 CFM $G_T = 1.24$

| Plate | Tare (g) | Final (g) | Net (g) | % | Cum. % | ECD (μ) |
|---|---|---|---|---|---|---|
| 1 | 27.3058<br>27.3065 / 27.3061 | 27.3100 | 0.0039 | 16.1 | 100.0 | $(12.7)^{\times 1.24} = 15.7$ |
| 2 | 28.4141<br>28.4145 > 28.4143 | 28.4180 | 0.0037 | 15.3 | 83.9 | (8.0) → 9.9 |
| 3 | 29.2126<br>29.21[illegible] / 29.2130 | 29.2163 | 0.0033 | 13.6 | 68.6 | (5.3) → 6.6 |
| 4 | 21.9732<br>21.9735 > 21.9734 | 21.9760 | 0.0026 | 10.7 | 55.0 | (3.7) → 4.6 |
| 5 | 17.8934<br>17.8934 > 17.8934 | 17.8964 | 0.0030 | 12.4 | 44.3 | (2.3) → 2.8 |
| 6 | 17.9086<br>17.[illegible] > 17.9085 | 17.9113 | 0.0028 | 11.6 | 31.9 | (1.2) → 1.5 |
| 7 | 17.9875<br>17.9869 > 17.9872 | 17.9895 | 0.0023 | 9.5 | 20.3 | (.73) → .90 |
| 8 | 28.4004<br>28.4003 > 28.4004 | 28.4024 | 0.0020 | 8.3 | 10.8 | (.49) → .61 |
| Back Up Filter | 21.7915<br>21.7922 > 21.7919 | 21.7925 | 0.0006 | 2.5 | 2.5 | |

Total 0.0242 100.0

Data Sheet 6002-5

## PARTICULATE EMISSION CALCULATIONS

Test No. 19-7 Date 1-6-77 Location 19 Engr. ____

Unit No. ____ Fuel No.2 Oil Sampling Train and Method Anderson Impactor

Pitot Factor, Fs .83 Barometric Pressure, $P_{bar}$ 30.06 in. Hg

Tot. Liquid Collected, $V_{1c}$ 74 ml Total Particulate, $M_n$ 24.2 m gm

Velocity Head, ΔP 0.086 iwg Stack Temp., Ts 935 °R Stack Area, As 4.9 $ft^2$

Sample Volume, Vm 30 $ft^3$ Stack Press., Psg -0.2 iwg Excess $O_2$, $XO_2$% 2.95 %

Orifice Press. Diff., H 0.65 iwg Stack Gas Sp. Gravity, Gs 1.0 n.d.

Sample Time, θ 52.3 min Nozzle Dia., Dn 3/8 in. Meter Temp., $T_m$ ____ °R

*1. Sample Gas Volume $Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$ 30.17 SCF

2. Water Vapor $Vw_{std} = 0.0474\ V_{1c}$ $.104(30.17 + Vw_{STD}) = V_{w_{STD}}$ 3.50 SCF

3. Moisture Content Bwo = Eq. 2/(Eq. 1 + Eq. 2) .104 N.D.

4. Concentration a. $C = 0.0154\ Mn/Vm_{std}$ 0.0124 grains/DSCF

b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$ $1.77 \times 10^{-6}$ lb/DSCF

c. $C = \text{Eq. 4b} \times 16.018 \times 10^3$ 0.0283 grams/DSCM

5. Abs. Stack Press. $Ps = P_{bar} \times 13.6 + Psg$ 408.6 in. w abs.

6. Stack Gas Speed $Vs = 174\ Fs \sqrt{\Delta P Ts} \sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$ 1295 ft/min

7. Stack Gas Flow Rate @ 70°F a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$ 3597 WSCF/min

b. Qsd = Eq. 7a x (1. - Eq. 3) 3223 DSCF/min

8. Material Flow Ms = Eq. 7b x Eq. 4b x 60 0.342 lb/hr

9. $XO_2$ factor $XO_2f = 2090/(20.9 - XO_2\%)$ 116.4 N.D.

10. Emission a. E = Eq. 4b x Fe x Eq. 9 0.019 lb/MMBtu

b. E = Eq. 4c x Fm x Eq. 9 x 1000 8.16 ng/joule

11. % Isokinetic $I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$ 114 %

| | Oil | Gas | Coal |
|---|---|---|---|
| Fe SC Feet/$10^4$ Btu | 92.2 | 87.4 | 98.2 |
| Fm SC Meters/$10^4$ joules | 0.002475 | 0.002346 | 0.002636 |

*Multiply $Vm_{std}$ by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

$\frac{30.17}{52.3} \frac{SCF}{min} = 0.577$ ScFM

PLANT
LOCATION 19
OPERATOR
DATE 1-19-77
RUN NO. 19-74
SAMPLE BOX NO.
METER BOX NO.
METER H
C FACTOR @

METHOD 5 CONTROL CONSOLE READINGS

SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE
BAROMETRIC PRESSURE 29.73
ASSUMED MOISTURE, %
HEATER BOX SETTING
PROBE LENGTH, IN. 48
NOZZLE DIAMETER, IN. 1/2
PROBE HEATER SETTING

| Traverse Point Number | Sampling Time (e)Min. | Static Pressure ($P_s$), In. Hg. | Stack Temperature ($T_s$) °F | Velocity Head ($P_s$) | Pressure Differential Across Orifice Meter ($\Delta H$), In. $H_2O$ | Gas Sample Volume ($V_m$) $ft^3$ | Gas Sample Temperature at Dry Gas Meter | | Sample Box Temprtature °F | Temperature of Gas Leaving Condenser on Last Impinger °F |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Inlet ($T_{min.}$) °F | Outlet ($T_{mout}$) °F | | |
| | 1120 | | 475 | .85 | 1.45 | 2302.39 | | 65 | 310 | 45 |
| | 1121 | SHUT DOWN | | | | 2303.66 | | — | — | — |
| RESTART | 1128 | | 475 | .85 | 1.45 | 2303.66 | | 65 | 310 | 46 |
| | 1137 | | 480 | .85 | 1.45 | 2311.5 | | 65 | 305 | 50 |
| | 1145 | | 480 | .85 | 1.45 | 2321.00 | | 75 | 340 | 70 |
| | 1157 | | 480 | .85 | 1.45 | 2330.0 | | 75 | 340 | 75 |
| | 1207 | | 480 | .85 | 1.45 | 2338.00 | | 80 | 325 | 60 |
| | 1217 | | 480 | .85 | 1.45 | 2347.50 | | 90 | 330 | 50 |
| | 1227 | | 485 | .85 | 1.45 | 2355.00 | | 90 | 330 | 50 |
| | 1238 | | 490 | .85 | 1.45 | 2364.09 | | | | |
| | | | | | | | | | | |
| | 71 MIN | | | | | | | | | |
| | | | | | | | | | | |
| TOTAL | | | | | | 61.75 | | AVG. | AVG. | |
| AVERAGE | | | | | | | | AVG. | | |

## PARTICULATE CALCULATION SHEET

Test Crew
Test No. 19-74 Date 1-19-77 Location 19
Box No. Sample Probe Position
Test Description

---

Dry Gas Meter Vol. (ft$^3$)
Final 2364.09
Initial 2302.34
Total 61.75

Impinger Water Vol (ml)

| | 1 | 2 | 3 | S. Gel | Total |
|---|---|---|---|---|---|
| Final | 195 | 150 | 10 | 680.5 | |
| Initial | 100 | 100 | 0 | 660.0 | |
| Δ Vol | 95 | 50 | 10 | 20.5 | 175.5 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Beaker No. | | 7 | 8 | 9 | | | Filter No. 15 | Blank No. 16 |
| Date Weighed | | | | | | | | |
| Tare Wt. | 1 | 104.0052 | 99.3368 | 100.1855 | | | .8512 | .7999 |
| | 2 | 104.0051 | 99.3365 | 100.1855 | | | .8514 | .7999 |
| | 3 | | | | | | | .8000 |
| | 4 | | | | | | | |
| | 5 | | | | | | | |
| | 6 | | | | | | | |
| | Avg | 104.0052 | 99.3367 | 100.1855 | | | .8513 | .7999 |
| Bottle No. | | | | | | | | |
| Content | | Impinger (Water) | Probe (Acetone) | Probe (Water) | Cyclone (Acetone) | Flask (Dry) | | |
| Rinse (ml) | | 490 | 175 | 190 | | | | |
| Date Weighed or 250 Bake | | | | | | | | |
| Final Wt. 250 | 1 | 104.0740 | 99.3465 | 100.1896 | | | .8768 | .7999 |
| | 2 | 104.0742 | 99.3468 | 100.1895 | | | .8770 | .7999 |
| | 3 | | | | | | | |
| | 4 | | | | | | | |
| | 5 | | | | | | | |
| | 6 | | | | | | | |
| | Avg | 104.0741 | 99.3467 | 100.1896 | | | .8769 | .7999 |
| Residue wt Final 250-Tare | | .0689 | .0100 | .0041 | | | .0256 | 0 |
| Date Weighed or 650 Bake | | | | | | | | |
| Final Wt. 650 | 1 | | | | | | | |
| | 2 | | | | | | | |
| | 3 | | | | | | | |
| | 4 | | | | | | | |
| | 5 | | | | | | | |
| | 6 | | | | | | | |
| | Avg | | | | | | | |
| Residue Wt Final 650-Tare | | | | | | | | |

Comments:

Data Sheet 6002-3

## SOLID PARTICULATE EMISSION CALCULATIONS

Test No. 19-74 Date 1-19-77 Location 19 Engr. C. SOTTER

Unit No. 1 Fuel #2 OIL Sampling Train and Method Method 5

Pitot Factor, Fs .83 Barometric Pressure, $P_{bar}$ 29.73 in. Hg

Tot. Liquid Collected, $V_{1c}$ 175.5 ml ~~Total~~ SOLID Particulate, $M_n$ 39.7 m gm

Velocity Head, ΔP .085 iwg Stack Temp., Ts 940 °R Stack Area, As 4.90 $ft^2$

Sample Volume, Vm 61.75 $ft^3$ Stack Press., Psg -.2 iwg Excess $O_2$, $XO_2$% 1.1 %

Orifice Press. Diff., H 1.45 iwg Stack Gas Sp. Gravity, Gs 1.0 n.d.

Sample Time, θ 71 min Nozzle Dia., Dn 1/2 in. Meter Temp., $T_m$ ____ °R

*1. Sample Gas Volume $Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$ 61.54 SCF

2. Water Vapor $Vw_{std} = 0.0474\ V_{1c}$ 8.32 SCF

3. Moisture Content $Bwo = Eq.\ 2/(Eq.\ 1 + Eq.\ 2)$ .119 N.D.

4. Concentration a. $C = 0.0154\ Mn/Vm_{std}$ 0.0272 grains/DSCF

b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$ $3.891 \times 10^{-6}$ lb/DSCF

c. $C = Eq.\ 4b \times 16.018 \times 10^3$ $6.233 \times 10^{-2}$ grams/DSCM

5. Abs. Stack Press. $Ps = P_{bar} \times 13.6 + Psg$ 404.1 in. w abs.

6. Stack Gas Speed $Vs = 174\ Fs\ \sqrt{\Delta PTs}\sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$ 1296 ft/min

7. Stack Gas Flow Rate @ 70°F a. $Qsw = Eq.\ 6 \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$ 3554 WSCF/min

b. $Qsd = Eq.\ 7a \times (1. - Eq.\ 3)$ 3131 DSCF/min

8. Material Flow $Ms = Eq.\ 7b \times Eq.\ 4b \times 60$ $7.31 \times 10^{-1}$ lb/hr

9. $XO_2$ factor $XO_2f = 2090/(20.9 - XO_2\%)$ 105.6 N.D.

10. Emission a. $E = Eq.\ 4b \times Fe \times Eq.\ 9$ .0138 lb/MMBtu

b. $E = Eq.\ 4c \times Fm \times Eq.\ 9 \times 1000$ 5.95 ng/joule

11. % Isokinetic $I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$ 99.4 %

| | Oil | Gas | Coal |
|---|---|---|---|
| Fe SC Feet/$10^4$ Btu | 92.2 | 87.4 | 98.2 |
| Fm SC Meters/$10^4$ joules | 0.002475 | 0.002346 | 0.002636 |

*Multiply $Vm_{std}$ by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

## TOTAL PARTICULATE EMISSION CALCULATIONS

Test No. 19-74 Date 1-19-77 Location 19 Engr. G. SOTTER

Unit No. 1 Fuel #2 OIL Sampling Train and Method Method 5

Pitot Factor, Fs .83 Barometric Pressure, $P_{bar}$ 29.73 in. Hg

Tot. Liquid Collected, $V_{1c}$ 175.5 ml Total Particulate, $M_n$ 108.6 m gm

Velocity Head, ΔP .085 iwg Stack Temp., Ts 940 °R Stack Area, As 4.90 $ft^2$

Sample Volume, Vm 61.75 $ft^3$ Stack Press., Psg -.2 iwg Excess $O_2$, $XO_2$% 1.1 %

Orifice Press. Diff., H 1.45 iwg Stack Gas Sp. Gravity, Gs 1.0 n.d.

Sample Time, θ 71 min Nozzle Dia., Dn 1/2 in. Meter Temp., $T_m$ ______ °R

*1. Sample Gas Volume $Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$ 61.54 SCF

2. Water Vapor $Vw_{std} = 0.0474\ V_{1c}$ 8.32 SCF

3. Moisture Content $Bwo = Eq.\ 2/(Eq.\ 1 + Eq.\ 2)$ .119 N.D.

4. Concentration a. $C = 0.0154\ Mn/Vm_{std}$ 0.0272 grains/DSCF

b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$ $3.891 \times 10^{-6}$ lb/DSCF

c. $C = Eq.\ 4b \times 16.018 \times 10^3$ $6.233 \times 10^{-2}$ grams/DSCM

5. Abs. Stack Press. $Ps = P_{bar} \times 13.6 + Psg$ 404.1 in. w abs.

6. Stack Gas Speed $Vs = 174\ Fs\ \sqrt{\Delta P Ts}\sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$ 1296 ft/min

7. Stack Gas Flow Rate @ 70°F a. $Qsw = Eq.\ 6 \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$ 3554 WSCF/min

b. $Qsd = Eq.\ 7a \times (1. - Eq.\ 3)$ 3131 DSCF/min

8. Material Flow $Ms = Eq.\ 7b \times Eq.\ 4b \times 60$ $7.31 \times 10^{-1}$ lb/hr

9. $XO_2$ factor $XO_2f = 2090/(20.9 - XO_2\%)$ 105.6 N.D.

10. Emission a. $E = Eq.\ 4b \times Fe \times Eq.\ 9$ 0.0379 lb/MMBtu

b. $E = Eq.\ 4c \times Fm \times Eq.\ 9 \times 1000$ 16.29 ng/joule

11. % Isokinetic $I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$ 99.4 %

| | Oil | Gas | Coal |
|---|---|---|---|
| Fe SC Feet/$10^4$ Btu | 92.2 | 87.4 | 98.2 |
| Fm SC Meters/$10^4$ joules | 0.002475 | 0.002346 | 0.002636 |

*Multiply $Vm_{std}$ by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

PLANT
LOCATION 19
OPERATOR
DATE 1/19/77
RUN NO. 19-76
SAMPLE BOX NO.
METER BOX NO. 117091
METER H
C FACTOR @

NO.2 oil

METHOD 5 CONTROL CONSOLE READINGS

SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE
BAROMETRIC PRESSURE
ASSUMED MOISTURE, %
HEATER BOX SETTING
PROBE LENGTH, IN.
NOZZLE DIAMETER, IN. 3/8
PROBE HEATER SETTING

ANDERSON IMPACTOR

| Traverse Point Number | Sampling Time ~~(θ) Min~~. | Static Pressure ($P_s$), ~~In. Hg.~~ iwg | Stack Temperature ($T_s$) °F | Velocity Head ($P_s$) iwg | Pressure Differential Across Orifice Meter ($\Delta H$), In. $H_2O$ | Gas Sample Volume Meter Reading ~~($V_m$) ft~~$^3$ | Gas Sample Temperature at Dry Gas Meter | | Sample Box Temprtature °F | Temperature of Gas Leaving Condenser on Last Impinger °F |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Inlet ($T_{min.}$) °F | Outlet ($T_{mout}$) °F | | |
| | 1415 | NA | 480 | 0.085 | 0.65 | 2364.08 | 80 | NA | NA | 50 |
| | 1430 | | | | | 2373.00 | 80 | | | 50 |
| | 1445 | | | | | 2382.00 | 85 | | | 55 |
| | 1500 | ↓ | ↓ | ↓ | ↓ | 2390.50 | 90 | ↓ | ↓ | 55 |
| | 1506 | | | | | 2394.08 | | | | |
| | | | | | | | | | | |
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| | | | | | | | | | | |
| | | | | | | | | | | |
| TOTAL | | | | | | | | AVG. | AVG. | |
| AVERAGE | | | | | | | | AVG. | | |

# ANDERSEN CASCADE IMPACTOR DATA

Test No. 19-76 Location 19 Owner

Impactor No. 1 Nozzle Size 3/2 Filter No.

Stack Temperature 480 °F Impactor Flow Rate 0.588 CFM

$C_T = 1.245$

| Plate | Tare (g) | Final (g) | Net (g) | % | Cum. % | ECD (µ) |
|---|---|---|---|---|---|---|
| 1 | 27.3071 | 27.3102 | 0.0031 | 10.5 | 100.0 | (12.5) 15.6 |
| 2 | 28.4153 | 28.4180 | 0.0027 | 9.2 | 89.5 | (7.9) 9.8 |
| 3 | 29.2111 | 29.2145 | 0.0034 | 11.6 | 80.3 | (5.2) 6.5 |
| 4 | 21.9722 | 21.9757 | 0.0035 | 11.9 | 68.7 | (3.7) 4.6 |
| 5 | 17.8959 | 17.8992 | 0.0033 | 11.2 | 56.8 | (2.3) 2.9 |
| 6 | 17.9064 | 17.9094 | 0.0030 | 10.2 | 45.6 | (1.2) 1.5 |
| 7 | 18.0016 | 18.0033 | 0.0027 | 9.2 | 35.4 | (0.73) 0.91 |
| 8 | 28.4008 | 28.4036 | 0.0028 | 9.5 | 26.2 | (0.40) 0.60 |
| Back Up Filter | 21.7920 | 21.7969 | 0.0049 | 16.7 | 16.7 | |
| | | Total | 0.0294 | 100.0 | | |

Data Sheet 6002-5

## PARTICULATE EMISSION CALCULATIONS

Test No. 19-76 Date 1/19/77 Location 19 Engr. ______

Unit No. ______ Fuel No. 2 Oil Sampling Train and Method Anderson Impactor

Pitot Factor, Fs 0.83 Barometric Pressure, $P_{bar}$ 29.73 in. Hg

Tot. Liquid Collected, $V_{1c}$ 85 ml Total Particulate, $M_n$ 29.4 m gm

Velocity Head, ΔP 0.085 iwg Stack Temp., Ts 940 °R Stack Area, As 4.90 $ft^2$

Sample Volume, Vm 30 $ft^3$ Stack Press., Psg -0.2 iwg Excess $O_2$, $XO_2\%$ 1.08 %

Orifice Press. Diff., H 0.65 iwg Stack Gas Sp. Gravity, Gs 1.0 n.d.

Sample Time, θ 51 min Nozzle Dia., Dn 3/8 in. Meter Temp., $T_m$ 542 °R

*1. Sample Gas Volume $Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$ 29.84 SCF

2. Water Vapor $Vw_{std} = 0.0474\ V_{1c}$ 4.03 SCF

3. Moisture Content Bwo = Eq. 2/(Eq. 1 + Eq. 2) 0.119 N.D.

4. Concentration a. $C = 0.0154\ Mn/Vm_{std}$ 0.015 grains/DSCF

b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$ $2.17 \times 10^{-6}$ lb/DSCF

c. $C = \text{Eq. 4b} \times 16.018 \times 10^3$ 0.035 grams/DSCM

5. Abs. Stack Press. $Ps = P_{bar} \times 13.6 + Psg$ 404.1 in. w abs.

6. Stack Gas Speed $Vs = 174\ Fs\ \sqrt{\Delta P Ts}\sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$ 1296 ft/min

7. Stack Gas Flow Rate @ 70°F a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$ 3554 WSCF/min

b. Qsd = Eq. 7a x (1. - Eq. 3) 3131 DSCF/min

8. Material Flow Ms = Eq. 7b x Eq. 4b x 60 0.408 lb/hr

9. $XO_2$ factor $XO_2f = 2090/(20.9 - XO_2\%)$ 105.4 N.D.

10. Emission a. E = Eq. 4b x Fe x Eq. 9 0.021 lb/MMBtu

b. E = Eq. 4c x Fm x Eq. 9 x 1000 9.07 ng/joule

11. % Isokinetic $I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$ 119.3 %

| | Oil | Gas | Coal |
|---|---|---|---|
| Fe SC Feet/$10^4$ Btu | 92.2 | 87.4 | 98.2 |
| Fm SC Meters/$10^4$ joules | 0.002475 | 0.002346 | 0.002636 |

*Multiply $Vm_{std}$ by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

$\frac{30}{51}\ \frac{ft^3}{min} = 0.588\ \frac{ft^3}{min}$

PLANT
LOCATION 19
OPERATOR
DATE 1-20-77
RUN NO. 19 - 83,84
SAMPLE BOX NO.
METER BOX NO. 4-11-1091
METER H
C FACTOR @

## METHOD 5 CONTROL CONSOLE READINGS

AMBIENT TEMPERATURE 38°F
BAROMETRIC PRESSURE
ASSUMED MOISTURE, %
HEATER BOX SETTING
PROBE LENGTH, IN. 48
NOZZLE DIAMETER, IN. 1/4
PROBE HEATER SETTING

SCHEMATIC OF STACK CROSS SECTION

| Traverse Point Number | Sampling Time (e)Min. | Static Pressure ($P_s$), In. Hg. | Stack Temperature ($T_s$)°F | Velocity Head ($P_s$) | Pressure Differential Across Orifice Meter ($\Delta H$), In. $H_2O$ | Gas Sample Volume ($V_m$) ft$^3$ | Gas Sample Temperature at Dry Gas Meter | | Sample Box Temprtature °F | Temperature of Gas Leaving Condenser on Last Impinger °F |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Inlet ($T_{min.}$) °F | Outlet ($T_{mout}$) °F | | |
| | 1430 | | 530 | .092 | 1.57 | 2394.52 | | 80 | 310 | 80 |
| | 1445 | | 540 | .092 | 1.57 | 2407.00 | | 88 | 350 | 88 |
| | 1500 | | 540 | .092 | 1.57 | 2421.50 | | 95 | 350 | 95 |
| | 1515 | | 540 | .092 | 1.57 | 2435.00 | | 105 | 345 | 105 |
| | 1530 | | 545 | .092 | 1.57 | 2447.50 | | 110 | 345 | 110 |
| | 1545 | | 545 | .092 | 1.57 | 2460.68 | | 115 | 345 | 115 |
| | 75 MIN | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
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| | | | | | | | | | | |
| TOTAL | | | 540 | | | 66.16 | | AVG. | AVG. | |
| AVERAGE | | | | | | | | AVG. | | |

## PARTICULATE CALCULATION SHEET

Test Crew F. FIONESSA

Test No. 19-83, 84 Date 1-20-77 Location

Box No. 1 Sample Probe Position CENTER

Test Description

Dry Gas Meter Vol. ($ft^3$)

Final 2460.68

Initial 2394.52

Total 66.16

Impinger Water Vol (ml)

| | 1 | 2 | 3 | S. Gel | Total |
|---|---|---|---|---|---|
| Final | 210 | 152 | 6 | 682.0 | 1050.0 |
| Initial | 100 | 100 | 0 | 659.0 | 859.0 |
| Δ Vol | 110 | 52 | 6 | 23.0 | 191.0 |

| Beaker No. | | 10 | 11 | 12 | ACETONE BLANK 3 | $H_2O$ BLANK 1 | Filter No. 17 | Blank No. 18 |
|---|---|---|---|---|---|---|---|---|
| Date Weighed | | 1-5-77 | | | | | | |
| Tare Wt. | 1 | 100.9386 | 99.8094 | 100.9727 | 101.9838 | 100.0775 | .8505 | .8039 |
| | 2 | 100.9385 | 99.8092 | 100.9725 | 101.9839 | 100.0777 | .8505 | .8040 |
| | 3 | | | | | | | |
| | 4 | | | | | | | |
| | 5 | | | | | | | |
| | 6 | | | | | | | |
| | Avg | 100.9386 | 99.8093 | 100.9726 | 101.9839 | 100.0776 | .8505 | .8040 |
| Bottle No. | | | | | | | | |
| Content | | Impinger (Water) | Probe (Acetone) | Probe (Water) | Cyclone (Acetone) | Flask (Dry) | | |
| Rinse (ml) | | 775 | 500 | 350 | 200 | 200 | | |
| Date Weighed or 250 Bake | | 1-24-77 | | | | | 1-21-77 | |
| Final Wt. 250 | 1 | 100.9756 | 99.8140 | 100.9752 | 101.9855 | 100.0800 | .8655 | .8037 |
| | 2 | 100.9752 | 99.8140 | 100.9751 | 101.9855 | 100.0796 | .8656 | .8035 |
| | 3 | | | | | | | |
| | 4 | | | | | | | |
| | 5 | | | | | | | |
| | 6 | | | | | | | |
| | Avg | 100.9754 | 99.8140 | 100.9752 | 101.9855 | 100.0798 | .8656 | .8036 |
| Residue wt Final 250-Tare | | .0368 | .0047 | .0026 | .0016 | .0022 | .0151 | -.0004 |
| Date Weighed or 650 Bake | | | | | | | | |
| Final Wt. 650 | 1 | | | | | | | |
| | 2 | | | | | | | |
| | 3 | | | | | | | |
| | 4 | | | | | | | |
| | 5 | | | | | | | |
| | 6 | | | | | | | |
| | Avg | | | | | | | |
| Residue Wt Final 650-Tare | | | | | | | | |

Comments:

Data Sheet 6002-3

## SOLID PARTICULATE EMISSION CALCULATIONS

Test No. 19-83,84 Date 1-20-77 Location ____________ TECH ~~Engr.~~ R. PIONESSA

Unit No. 1 Fuel #2 OIL Sampling Train and Method Method 5

Pitot Factor, Fs .83 Barometric Pressure, $P_{bar}$ 29.80 in. Hg

Tot. Liquid Collected, $V_{1c}$ 191 ml SOLID Particulate, $M_n$ 14.2 m gm

Velocity Head, ΔP .092 iwg Stack Temp., Ts 1000 °R Stack Area, As 4.9 $ft^2$

Sample Volume, Vm 66.16 $ft^3$ Stack Press., Psg -.225 iwg Excess $O_2$, $XO_2$% .85 %

Orifice Press. Diff., H 1.57 iwg Stack Gas Sp. Gravity, Gs ________ n.d.

Sample Time, θ 75 min Nozzle Dia., Dn 1/2 in. Meter Temp., $T_m$ ________ °R

*1. Sample Gas Volume $Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$ 66.11 SCF

2. Water Vapor $Vw_{std} = 0.0474\ V_{1c}$ 9.05 SCF

3. Moisture Content $Bwo = Eq.\ 2/(Eq.\ 1 + Eq.\ 2)$ 0.120 N.D.

4. Concentration a. $C = 0.0154\ Mn/Vm_{std}$ .0033 grains/DSCF

b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$ $.474 \times 10^{-6}$ lb/DSCF

c. $C = Eq.\ 4b \times 16.018 \times 10^3$ $.758 \times 10^{-2}$ grams/DSCM

5. Abs. Stack Press. $Ps = P_{bar} \times 13.6 + Psg$ 405 in. w abs.

6. Stack Gas Speed $Vs = 174\ Fs\ \sqrt{\Delta P Ts}\sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$ 1388 ft/min

7. Stack Gas Flow Rate @ 70°F a. $Qsw = Eq.\ 6 \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$ 3588 WSCF/min

b. $Qsd = Eq.\ 7a \times (1. - Eq.\ 3)$ 3158 DSCF/min

8. Material Flow $Ms = Eq.\ 7b \times Eq.\ 4b \times 60$ $.898 \times 10^{-1}$ lb/hr

9. $XO_2$ factor $XO_2f = 2090/(20.9 - XO_2\%)$ 103.98 N.D.

10. Emission a. $E = Eq.\ 4b \times Fe \times Eq.\ 9$ $.454 \times 10^{-2}$ lb/MMBtu

b. $E = Eq.\ 4c \times Fm \times Eq.\ 9 \times 1000$ 1.95 ng/joule

11. % Isokinetic $I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$ 100.4 %

| | Oil | Gas | Coal |
|---|---|---|---|
| Fe SC Feet/$10^4$ Btu | 92.2 | 87.4 | 98.2 |
| Fm SC Meters/$10^4$ joules | 0.002475 | 0.002346 | 0.002636 |

*Multiply $Vm_{std}$ by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

## TOTAL PARTICULATE EMISSION CALCULATIONS

Test No. 19-83,84 Date 1-20-77 Location 19 TECH ~~Engr.~~ R. PIONESSA

Unit No. 1 Fuel #2 OIL Sampling Train and Method Method 5

Pitot Factor, Fs .83 Barometric Pressure, $P_{bar}$ 29.80 in. Hg

Tot. Liquid Collected, $V_{1c}$ 191 ml Total Particulate, $M_n$ 42.5 m gm

Velocity Head, $\Delta P$ .092 iwg Stack Temp., Ts 1000 °R Stack Area, As 4.90 $ft^2$

Sample Volume, Vm 66.16 $ft^3$ Stack Press., Psg -.225 iwg Excess $O_2$, $XO_2$% .85 %

Orifice Press. Diff., H 1.57 iwg Stack Gas Sp. Gravity, Gs ______ n.d.

Sample Time, θ 75 min Nozzle Dia., Dn 1/2 in. Meter Temp., $T_m$ ______ °R

| | | | |
|---|---|---|---|
| *1. Sample Gas Volume | $Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$ | 66.11 | SCF |
| 2. Water Vapor | $Vw_{std} = 0.0474\ V_{1c}$ | 9.05 | SCF |
| 3. Moisture Content | Bwo = Eq. 2/(Eq. 1 + Eq. 2) | 0.120 | N.D. |
| 4. Concentration | a. $C = 0.0154\ Mn/Vm_{std}$ | .0099 | grains/DSCF |
| | b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$ | $1.418 \times 10^{-6}$ | lb/DSCF |
| | c. $C = \text{Eq. 4b} \times 16.018 \times 10^3$ | $2.270 \times 10^{-2}$ | grams/DSCM |
| 5. Abs. Stack Press. | $Ps = P_{bar} \times 13.6 + Psg$ | 405.0 | in. w abs. |
| 6. Stack Gas Speed | $Vs = 174\ Fs \sqrt{\Delta P Ts} \sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$ | 1388 | ft/min |
| 7. Stack Gas Flow Rate @ 70°F | a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$ | 3588 | WSCF/min |
| | b. Qsd = Eq. 7a x (1. - Eq. 3) | 3158 | DSCF/min |
| 8. Material Flow | Ms = Eq. 7b x Eq. 4b x 60 | $2.687 \times 10^{-1}$ | lb/hr |
| 9. $XO_2$ factor | $XO_2f = 2090/(20.9 - XO_2\%)$ | 103.98 | N.D. |
| 10. Emission | a. E = Eq. 4b x Fe x Eq. 9 | $1.359 \times 10^{-2}$ | lb/MMBtu |
| | b. E = Eq. 4c x Fm x Eq. 9 x 1000 | 5.84 | ng/joule |
| 11. % Isokinetic | $I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$ | 100.4 | % |

| | Oil | Gas | Coal |
|---|---|---|---|
| Fe SC Feet/$10^4$ Btu | 92.2 | 87.4 | 98.2 |
| Fm SC Meters/$10^4$ joules | 0.002475 | 0.002346 | 0.002636 |

*Multiply $Vm_{std}$ by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

PLANT
LOCATION 19
OPERATOR
DATE 1/20/77
RUN NO. 19-85
SAMPLE BOX NO.
METER BOX NO. 4-11-1091
METER H
C FACTOR @

No.2 oil

METHOD 5 CONTROL CONSOLE READINGS

AMBIENT TEMPERATURE 39
BAROMETRIC PRESSURE 22.8 in Hg
ASSUMED MOISTURE, %
HEATER BOX SETTING
PROBE LENGTH, IN.
NOZZLE DIAMETER, IN. 3/8
PROBE HEATER SETTING

ANDERSON IMPACTOR

SCHEMATIC OF STACK CROSS SECTION

| Traverse Point Number | Sampling Time (e)Min. | Static Pressure ($P_s$), In. ~~Hg.~~ $H_2O$ | Stack Temperature ($T_s$) °F | Velocity Head ($P_s$) (iwg) | Pressure Differential Across Orifice Meter ($\Delta H$), In. $H_2O$ | Gas Sample Volume Meter Reading ($V_m$) $ft^3$ | Gas Sample Temperature at Dry Gas Meter Inlet ($T_{min.}$) °F | Gas Sample Temperature at Dry Gas Meter Outlet ($T_{mout}$) °F | Sample Box Temprtature °F | Temperature of Gas Leaving Condenser on Last Impinger °F |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1602:30 | | 540 | 0.092 | 0.7 | 2461.03 | 100 | NA | NA | 60 |
| | 1615:00 | | | | | 2468.20 | 120 | | | 60 |
| | 1630:00 | | | | | 2477.00 | 110 | | | 60 |
| | 1645:00 | | ↓ | | | 2486.00 | 100 | ↓ | ↓ | 63 |
| | 1655:30 | | | ↓ | ↓ | 2491.03 | | | | |
| | | | | | | 30.0 | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| TOTAL | | | | | | | | | | |
| AVERAGE | | | | | | | AVG. | AVG. | AVG. | |

## ANDERSEN CASCADE IMPACTOR DATA

Test No. 19-85 Location 19 Owner

Impactor No. 1 Nozzle Size 3/8 Filter No.

Stack Temperature °F Impactor Flow Rate CFM

| Plate | Tare (g) | Final (g) | Net (g) | % | Cum. % | ECD (μ) |
|---|---|---|---|---|---|---|
| 1 | 27.3108 | 27.3124 | 0.0016 | 13.6 | 100.0 | (12.5) 15.9 |
| 2 | 28.4147 | 28.4164 | 0.0017 | 14.4 | 86.4 | (7.0) 8.9 |
| 3 | 29.2168 | 29.2183 | 0.0015 | 12.7 | 72.0 | (5.2) 6.6 |
| 4 | 21.9719 | 21.9734 | 0.0015 | 12.7 | 59.3 | (3.7) 4.7 |
| 5 | 17.8959 | 17.8975 | 0.0016 | 13.6 | 46.6 | (2.4) 3.1 |
| 6 | 17.9086 | 17.9097 | 0.0011 | 9.3 | 33.0 | (1.2) 1.5 |
| 7 | 17.9875 | 17.9888 | 0.0013 | 11.0 | 23.7 | (0.73) 0.93 |
| 8 | 28.4043 | 28.4058 | 0.0015 | 12.7 | 12.7 | (0.49) 0.62 |
| Back Up Filter | 21.7923 | 21.7923 | 0 | 0 | 0 | 0 0 |
|  | 1-20-77 | 1-21-77 |  |  |  |  |

Total 0.0118

Data Sheet 6002-5

## PARTICULATE EMISSION CALCULATIONS

Test No. 19-85 Date 1-20-77 Location 19 Engr. ____

Unit No. 1 Fuel NO.2 Oil Sampling Train and Method Anderson Impactor

Pitot Factor, Fs 0.83 Barometric Pressure, $P_{bar}$ 29.60 in. Hg

Tot. Liquid Collected, $V_{lc}$ 86 ml Total Particulate, $M_n$ 11.8 m gm

Velocity Head, ΔP 0.092 iwg Stack Temp., Ts 1000 °R Stack Area, As 4.9 $ft^2$

Sample Volume, Vm 30.0 $ft^3$ Stack Press., Psg -0.225 iwg* Excess $O_2$, $XO_2$% .68 %

Orifice Press. Diff., H 0.7 iwg Stack Gas Sp. Gravity, Gs 1.0 n.d.

Sample Time, θ 53 min Nozzle Dia., Dn 3/8 in. Meter Temp., $T_m$ 567 °R

*1. Sample Gas Volume $Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$ 29.41 SCF

2. Water Vapor $Vw_{std} = 0.0474\ V_{lc}$ 4.08 SCF

3. Moisture Content Bwo = Eq. 2/(Eq. 1 + Eq. 2) 0.120 N.D.

4. Concentration a. $C = 0.0154\ Mn/Vm_{std}$ 0.00618 grains/DSCF

b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$ $0.884 \times 10^{-6}$ lb/DSCF

c. $C = \text{Eq. 4b} \times 16.018 \times 10^{3}$ 0.0142 grams/DSCM

5. Abs. Stack Press. $Ps = P_{bar} \times 13.6 + Psg$ 405.0 in. w abs.

6. Stack Gas Speed $Vs = 174\ Fs \sqrt{\Delta P Ts} \sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$ 1388 ft/min

7. Stack Gas Flow Rate @ 70°F a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$ 3588 WSCF/min

b. Qsd = Eq. 7a x (1. - Eq. 3) 3157 DSCF/min

8. Material Flow Ms = Eq. 7b x Eq. 4b x 60 0.167 lb/hr

9. $XO_2$ factor $XO_2f = 2090/(20.9 - XO_2\%)$ 103.4 N.D.

10. Emission a. E = Eq. 4b x Fe x Eq. 9 0.00843 lb/MMBtu

b. E = Eq. 4c x Fm x Eq. 9 x 1000 3.624 ng/joule

11. % Isokinetic $I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$ 114 %

| | Oil | Gas | Coal |
|---|---|---|---|
| Fe SC Feet/$10^4$ Btu | 92.2 | 87.4 | 98.2 |
| Fm SC Meters/$10^4$ joules | 0.002475 | 0.002346 | 0.002636 |

$\frac{29.91}{52}$ SCFM = 0.575 Scfm

*Multiply $Vm_{std}$ by $530/T_m$(°R) if meter not temp. compensated. Data Sheet 6002-4

* Assumed from 4G2P

PLANT
LOCATION 19
OPERATOR R. PIONESSA
DATE 1-24-77
RUN NO. 19- 9798
SAMPLE BOX NO.
METER BOX NO. 4-11-1091
METER H
C FACTOR @

**METHOD 5 CONTROL CONSOLE READINGS**

AMBIENT TEMPERATURE 17 °F
BAROMETRIC PRESSURE 30.16
ASSUMED MOISTURE, %
HEATER BOX SETTING
PROBE LENGTH, IN. 48
NOZZLE DIAMETER, IN. 1/2
PROBE HEATER SETTING

SCHEMATIC OF STACK CROSS SECTION

| Traverse Point Number | Sampling Time (e) Min. | Static Pressure $(P_s)$, In. Hg. | Stack Temperature $(T_s)$ °F | Velocity Head $(P_s)$ | Pressure Differential Across Orifice Meter $(\Delta H)$, In. $H_2O$ | Gas Sample Volume $(V_m)$ ft$^3$ | Gas Sample Temperature at Dry Gas Meter | | Sample Box Temprtature °F | Temperature of Gas Leaving Condenser on Last Impinger °F |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Inlet $(T_{min.})$ °F | Outlet $(T_{mout})$ °F | | |
| | 1007 | | 480 | .095 | 1.65 | 2491.35 | | 80 | 320 | 40 |
| | 1022 | | 490 | .095 | 1.65 | 2506.00 | | 85 | 340 | 55 |
| | 1037 | | 490 | .095 | 1.65 | 2519.00 | | 90 | 340 | 70 |
| | 1052 | | 490 | .095 | 1.65 | 2533.00 | | 95 | 345 | 60 |
| | 1107 | | 490 | .095 | 1.65 | 2547.00 | | 100 | 350 | 48 |
| | 1115 | | | | | 2554.80 | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| TOTAL | 68 min | | | | | 63.45 | | AVG. | AVG. | |
| AVERAGE | | | | | | | | AVG. | | |

## PARTICULATE CALCULATION SHEET

Test Crew R. PIONESSA

Test No. 19-97, 98 Date 1-24-77 Location 19

Box No.________ Sample Probe Position________

Test Description

---

Dry Gas Meter Vol. ($ft^3$)

Final 2554.60

Initial 2491.35

Total 63.45

Impinger Water Vol (ml)

| | 1 | 2 | 3 | S. Gel | Total |
|---|---|---|---|---|---|
| Final | 166 | 146 | 3 | 672.5 | 987.5 |
| Initial | 100 | 100 | 0 | 650.5 | 850.5 |
| Δ Vol | 66 | 46 | 3 | 22.0 | 137.0 |

| | | | | | ACETONE BLANK | H2O BLANK | | |
|---|---|---|---|---|---|---|---|---|
| Beaker No. | | 4 | 5 | 6 | 7 | 8 | Filter No. 14 | Blank No. 16 |
| Date Weighed | | 1-21-77 | | | | | | → |
| Tare Wt. | 1 | 99.2650 | 98.9319 | 100.4839 | 104.0054 | 99.3369 | .8452 | .7999 |
| | 2 | 99.2650 | 98.9320 | 100.4840 | 104.0054 | 99.3366 | .8454 | .7999 |
| | 3 | | | | | | | .8000 |
| | 4 | | | | | | | |
| | 5 | | | | | | | |
| | 6 | | | | | | | |
| | Avg | 99.2650 | 98.9320 | 100.4840 | 104.0054 | 99.3368 | .8453 | .7999 |
| Bottle No. | | | | | | | | |
| Content | | Impinger (Water) | Probe (Acetone) | Probe (Water) | Cyclone (Acetone) | Flask (Dry) | | |
| Rinse (ml) | | 750 | 550 | 350 | 200 | 200 | | |
| Date Weighed or 250 Bake | | 1-26-77 | 1-25-77 | | | | | → |
| Final Wt. 250 | 1 | 99.3202 | 98.9426 | 100.5026 | 104.0048 | 99.3365 | .9228 | .7999 |
| | 2 | 99.3200 | 98.9427 | 100.5026 | 104.0046 | 99.3365 | .9228 | .7998 |
| | 3 | | | | | | | |
| | 4 | | | | | | | |
| | 5 | | | | | | | |
| | 6 | | | | | | | |
| | Avg | 99.3201 | 98.9427 | 100.5026 | 104.0047 | 99.3365 | .9228 | .7999 |
| Residue wt Final 250-Tare | | .0551 | .0107 | .0186 | .0007 | .0003 | .0775 | 0 |
| Date Weighed or 650 Bake | | | | | | | | |
| Final Wt. 650 | 1 | | | | | | | |
| | 2 | | | | | | | |
| | 3 | | | | | | | |
| | 4 | | | | | | | |
| | 5 | | | | | | | |
| | 6 | | | | | | | |
| | Avg | | | | | | | |
| Residue Wt Final 650-Tare | | | | | | | | |

Comments:

Data Sheet 6002-3

## SOLID PARTICULATE EMISSION CALCULATIONS

Test No. 19-57,98 Date 1-24-77 Location 19 Engr. G. SCOTTER

Unit No. 1 Fuel #6 OIL Sampling Train and Method Method 5

Pitot Factor, Fs .83 Barometric Pressure, $P_{bar}$ 30.16 in. Hg

Tot. Liquid Collected, $V_{1c}$ 137.0 ml SOLID Particulate, $M_n$ 171.8 m gm

Velocity Head, ΔP .095 iwg Stack Temp., Ts 950 °R Stack Area, As 4.90 $ft^2$

Sample Volume, Vm 63.45 $ft^3$ Stack Press., Psg -.225 iwg Excess $O_2$, $XO_2$% 3.15 %

Orifice Press. Diff., H 1.65 iwg Stack Gas Sp. Gravity, Gs ______ n.d.

Sample Time, θ 68 min Nozzle Dia., Dn 1/2 in. Meter Temp., $T_m$ ______ °R

| | | | |
|---|---|---|---|
| *1. Sample Gas Volume | $Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$ | 64.17 | SCF |
| 2. Water Vapor | $Vw_{std} = 0.0474\ V_{1c}$ | 6.49 | SCF |
| 3. Moisture Content | Bwo = Eq. 2/(Eq. 1 + Eq. 2) | .092 | N.D. |
| 4. Concentration | a. $C = 0.0154\ Mn/Vm_{std}$ | .0412 | grains/DSCF |
| | b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$ | 5.903 | lb/DSCF |
| | c. $C = \text{Eq. 4b} \times 16.018 \times 10^3$ | $0.946 \times 10^{-1}$ | grams/DSCM |
| 5. Abs. Stack Press. | $Ps = P_{bar} \times 13.6 + Psg$ | 409.95 | in. w abs. |
| 6. Stack Gas Speed | $Vs = 174\ Fs\ \sqrt{\Delta P Ts}\ \sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$ | 1367 | ft/min |
| 7. Stack Gas Flow Rate @ 70°F | a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$ | 3764 | WSCF/min |
| | b. Qsd = Eq. 7a x (1. - Eq. 3) | 3418 | DSCF/min |
| 8. Material Flow | Ms = Eq. 7b x Eq. 4b x 60 | 1.210 | lb/hr |
| 9. $XO_2$ factor | $XO_2f = 2090/(20.9 - XO_2\%)$ | 117.7 | N.D. |
| 10. Emission | a. E = Eq. 4b x Fe x Eq. 9 | $6.406 \times 10^{-2}$ | lb/MMBtu |
| | b. E = Eq. 4c x Fm x Eq. 9 x 1000 | 27.56 | ng/joule |
| 11. % Isokinetic | $I = \dfrac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$ | 99.2 | % |

| | Oil | Gas | Coal |
|---|---|---|---|
| Fe SC Feet/$10^4$ Btu | 92.2 | 87.4 | 98.2 |
| Fm SC Meters/$10^4$ joules | 0.002475 | 0.002346 | 0.002636 |

*Multiply $Vm_{std}$ by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

## TOTAL PARTICULATE EMISSION CALCULATIONS

Test No. 19-9798 Date 1-24-77 Location 19 Engr. G SOTTER

Unit No. 1 Fuel #6 OIL Sampling Train and Method Method 5

Pitot Factor, Fs .83 Barometric Pressure, $P_{bar}$ 30.16 in. Hg

Tot. Liquid Collected, $V_{1c}$ 137.0 ml Total Particulate, $M_n$ 225.8 m gm

Velocity Head, ΔP .095 iwg Stack Temp., Ts 950 °R Stack Area, As 4.90 $ft^2$

Sample Volume, Vm 63.45 $ft^3$ Stack Press., Psg -.225 iwg Excess $O_2$, $XO_2$% 3.15 %

Orifice Press. Diff., H 1.65 iwg Stack Gas Sp. Gravity, Gs ______ n.d.

Sample Time, θ 68 min Nozzle Dia., Dn 1/2 in. Meter Temp., $T_m$ ______ °R

*1. Sample Gas Volume $Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$ 64.17 SCF

2. Water Vapor $Vw_{std} = 0.0474\ V_{1c}$ 6.49 SCF

3. Moisture Content Bwo = Eq. 2/(Eq. 1 + Eq. 2) .092 N.D.

4. Concentration a. $C = 0.0154\ Mn/Vm_{std}$ .0542 grains/DSCF

b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$ $7.759 \times 10^{-6}$ lb/DSCF

c. $C = \text{Eq. 4b} \times 16.018 \times 10^{3}$ $1.243 \times 10^{-1}$ grams/DSCM

5. Abs. Stack Press. $Ps = P_{bar} \times 13.6 + Psg$ 409.95 in. w abs.

6. Stack Gas Speed $Vs = 174\ Fs \sqrt{\Delta P Ts} \sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$ 1367 ft/min

7. Stack Gas Flow Rate @ 70°F a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$ 3764 WSCF/min

b. Qsd = Eq. 7a x (1. - Eq. 3) 3418 DSCF/min

8. Material Flow Ms = Eq. 7b x Eq. 4b x 60 1.591 lb/hr

9. $XO_2$ factor $XO_2f = 2090/(20.9 - XO_2\%)$ 117.7 N.D.

10. Emission a. E = Eq. 4b x Fe x Eq. 9 $8.42 \times 10^{-2}$ lb/MMBtu

b. E = Eq. 4c x Fm x Eq. 9 x 1000 36.21 ng/joule

11. % Isokinetic $I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$ 99.2 %

| | Oil | Gas | Coal |
|---|---|---|---|
| Fe SC Feet/$10^4$ Btu | 92.2 | 87.4 | 98.2 |
| Fm SC Meters/$10^4$ joules | 0.002475 | 0.002346 | 0.002636 |

*Multiply $Vm_{std}$ by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

PLANT
LOCATION 19
OPERATOR
DATE 1/24/77
RUN NO. 17-99
SAMPLE BOX NO. No.6 0:1
METER BOX NO. 4-11-1091
METER H
C FACTOR @

METHOD 5 CONTROL CONSOLE READINGS

AMBIENT TEMPERATURE 30 °F
BAROMETRIC PRESSURE 30.00 in Hg
ASSUMED MOISTURE, %
HEATER BOX SETTING
PROBE LENGTH, IN. 3/8
NOZZLE DIAMETER, IN.
PROBE HEATER SETTING

ANDERSON IMPACTOR

SCHEMATIC OF STACK CROSS SECTION

| Traverse Point Number | Sampling Time (e)Min. | Static Pressure $(P_s)$, ~~In. Hg.~~ iwg | Stack Temperature $(T_s)$ °F | Velocity Head $(P_s)$ iwg | Pressure Differential Across Orifice Meter $(\Delta H)$, In. $H_2O$ | Gas Sample Volume Meter Reading ~~$(V_m)$ ft$^3$~~ | Gas Sample Temperature at Dry Gas Meter | | Sample Box Temprtature °F | Temperature of Gas Leaving Condenser on Last Impinger °F |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Inlet $(T_{min.})$ °F | Outlet $(T_{mout})$ °F | | |
| | 1430 | -0.225 | 485 | 1095 | 0.74 | 2553.87 | 60 | NA | NA | 50 |
| | 1440 | ↓ | ↓ | ↓ | ↓ | 2560.00 | 65 | ↓ | ↓ | 60 |
| | 1454 | | | | | 2568.87 | 70 | | | 60 |
| | 24 | | | | | 15.00 | | | | |
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| | | | | | | | | | | |
| | | | | | | | | | | |
| TOTAL | | | | | | | | AVG. | AVG. | |
| AVERAGE | | | | | | | | AVG. | | |

## ANDERSEN CASCADE IMPACTOR DATA

Test No. 19-99 Location 19 Owner

Impactor No. 1 Nozzle Size 3/8 Filter No.

Stack Temperature 485 °F Impactor Flow Rate 0.627 CFM

G= 1.245

| Plate | Tare (g) | Final (g) | Net (g) | % | Cum. % | ECD (μ) |
|---|---|---|---|---|---|---|
| 1 | 27.3086 | 27.3123 | 0.0037 | 14.2 | 100.0 | (12.1) 15.1 |
| 2 | 28.4141 | 28.4179 | 0.0038 | 14.5 | 85.8 | (7.7) 9.6 |
| 3 | 29.2135 | 29.2167 | 0.0032 | 12.3 | 71.3 | (5.1) 6.3 |
| 4 | 21.9703 | 21.9733 | 0.0030 | 11.5 | 59.0 | (3.6) 4.5 |
| 5 | 17.8991 | 17.9007 | 0.0016 | 6.1 | 47.5 | (2.3) 2.9 |
| 6 | 17.9123 | 17.9148 | 0.0025 | 9.6 | 41.4 | (1.15) 1.43 |
| 7 | 17.9869 | 17.9894 | 0.0025 | 9.6 | 31.8 | (0.70) 0.87 |
| 8 | 28.4000 | 28.4022 | 0.0022 | 8.4 | 22.2 | (0.46) 0.57 |
| Back Up Filter | 21.7922 | 21.7958 | 0.0036 | 13.8 | 13.8 | |

Total 0.0261 100.0

Data Sheet 6002-5

# PARTICULATE EMISSION CALCULATIONS

Test No. 19-99 Date 1-04-77 Location 19 Engr. ______

Unit No. 1 Fuel No. 6 oil Sampling Train and Method Anderson Impactor

Pitot Factor, Fs .683 Barometric Pressure, $P_{bar}$ 30.00 in. Hg

Tot. Liquid Collected, $V_{1c}$ ______ ml Total Particulate, $M_n$ 26.1 m gm

Velocity Head, ΔP 0.095 iwg Stack Temp., Ts 945 °R Stack Area, As 4.9 $ft^2$

Sample Volume, Vm 15 $ft^3$ Stack Press., Psg -0.225 iwg Excess $O_2$, $XO_2$% 3.1 %

Orifice Press. Diff., H 0.74 iwg Stack Gas Sp. Gravity, Gs ______ n.d.

Sample Time, θ 24 min Nozzle Dia., Dn 0.375 in. Meter Temp., $T_m$ 65 ~~°R~~ °F

| | | | |
|---|---|---|---|
| *1. Sample Gas Volume | $Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$ | 15.06 | SCF |
| 2. Water Vapor | $Vw_{std} = 0.0474\ V_{1c}$ | 1.52 | SCF |
| 3. Moisture Content | $Bwo = Eq.\ 2/(Eq.\ 1 + Eq.\ 2)$ | 0.092 | N.D. * |
| 4. Concentration | a. $C = 0.0154\ Mn/Vm_{std}$ | 0.0267 | grains/DSCF |
| | b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$ | $3.82 \times 10^{-6}$ | lb/DSCF |
| | c. $C = Eq.\ 4b \times 16.018 \times 10^3$ | 0.0612 | grams/DSCM |
| 5. Abs. Stack Press. | $Ps = P_{bar} \times 13.6 + Psg$ | 407.78 | in. w abs. |
| 6. Stack Gas Speed | $Vs = 174\ Fs \sqrt{\Delta PTs} \sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$ | 1367 | ft/min |
| 7. Stack Gas Flow Rate @ 70°F | a. $Qsw = Eq.\ 6 \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$ | 3764 | WSCF/min |
| | b. $Qsd = Eq.\ 7a \times (1. - Eq.\ 3)$ | 3417 | DSCF/min |
| 8. Material Flow | $Ms = Eq.\ 7b \times Eq.\ 4b \times 60$ | 0.783 | lb/hr |
| 9. $XO_2$ factor | $XO_2f = 2090/(20.9 - XO_2\%)$ | 117.4 | N.D. |
| 10. Emission | a. $E = Eq.\ 4b \times Fe \times Eq.\ 9$ | 0.0414 | lb/MMBtu |
| | b. $E = Eq.\ 4c \times Fm \times Eq.\ 9 \times 1000$ | 17.78 | ng/joule |
| 11. % Isokinetic | $I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$ | 117 | % |

| | Oil | Gas | Coal |
|---|---|---|---|
| Fe SC Feet/$10^4$ Btu | 92.2 | 87.4 | 98.2 |
| Fm SC Meters/$10^4$ joules | 0.002475 | 0.002346 | 0.002636 |

$\frac{15.06}{24}$ SCFM = 0.627 SCFM

*Multiply $Vm_{std}$ by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

*From 11-4P

PLANT
LOCATION 19
OPERATOR
DATE 1-26-77
RUN NO. 19-116
SAMPLE BOX NO. 1
METER BOX NO. 4-11-1091
METER H
C FACTOR @ 0.83

METHOD 5

## METHOD 5 CONTROL CONSOLE READINGS

AMBIENT TEMPERATURE 26 °F
BAROMETRIC PRESSURE 29.72
ASSUMED MOISTURE, %
HEATER BOX SETTING
PROBE LENGTH, IN. 48
NOZZLE DIAMETER, IN. 1/2
PROBE HEATER SETTING

SCHEMATIC OF STACK CROSS SECTION

| Traverse Point Number | Sampling Time (e) Min. | Static Pressure $(P_s)$, In. ~~Hg~~ $H_2O$ | Stack Temperature $(T_s)$ °F | Velocity Head $(P_s)$ | Pressure Differential Across Orifice Meter $(\Delta H)$, In. $H_2O$ | Gas Sample Volume $(V_m)$ $ft^3$ | Gas Sample Temperature at Dry Gas Meter | | Sample Box Temprtature °F | Temperature of Gas Leaving Condenser on Last Impinger °F |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Inlet $(T_{min.})$ °F | Outlet $(T_{mout})$ °F | | |
| | 5 | -.225 | 500 | 0.108 | 1.75 | 2569.30 | 80 | | 300 | 50 |
| | 20 | | 505 | 0.125 | 1.60 | 2583.00 | 85 | | 350 | 65 |
| | 35 | | 510 | 0.130 | 1.57 | 2597.00 | 92 | | 350 | 62 |
| | 50 | | 510 | 0.130 | 1.60 | 2610.00 | 100 | | 320 | 55 |
| | 1:05 | | 515 | 0.130 | 1.62 | 2624.00 | 108 | | 310 | 55 |
| | 1:12 | | 515 | 0.130 | 1.60 | 2629.30 | 110 | | 310 | 55 |
| | | | | | | | | | | |
| | | | | | | | | | | |
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| | | | | | | | | | | |
| TOTAL | 67 min. | | | | | 60 | | AVG. | AVG. | |
| AVERAGE | | -0.225 | 509 | 0.1255 | 1.62 | | | AVG. | | |

## PARTICULATE CALCULATION SHEET

Test Crew
Test No. 19-116 Date 1·26·77 Location 19
Box No. 1 Sample Probe Position center
Test Description

Dry Gas Meter Vol. (ft$^3$)
Final 2629.30
Initial 2569.30
Total 60.0

Impinger Water Vol (ml)

| | 1 | 2 | 3 | S. Gel | Total |
|---|---|---|---|---|---|
| Final | 187 | 142 | 3 | 663.0 | 995.0 |
| Initial | 100 | 100 | 0 | 644.8 | 844.8 |
| Δ Vol | 87 | 42 | 3 | 18.2 | 150.2 |

| | | | | | Acetone Blank | H$_2$O Blank | Filter No. 16 | Blank No. 18 |
|---|---|---|---|---|---|---|---|---|
| Beaker No. | | 1 | 3 | 9 | 10 | 11 | | |
| Date Weighed | | 1·25·77 | | | | → | 1·25·77 | |
| Tare Wt. | 1 | 100.0776 | 101.9842 | 100.1851 | 100.9366 | | 0.7999 | 0.8033 |
| | 2 | 100.0776 | 101.9843 | 100.1850 | 100.9366 | | 0.7998 | 0.8035 |
| | 3 | | | | | | | |
| | 4 | | | | | | | |
| | 5 | | | | | | | |
| | 6 | | | | | | | |
| | Avg | 100.0776 | 101.9843 | 100.1851 | 100.9366 | | 0.7999 | 0.8034 |
| Bottle No. | | 1&2 | 3 | 4 | | | | |
| Content | | Impinger (Water) | Probe (Acetone) | Probe (Water) | Cyclone (Acetone) | ~~Flask~~ (Dry) | | |
| Rinse (ml) | | | | | | | | |
| Date Weighed or 250 Bake | | 2·15·77 | 2·15·77 | 2·15·77 | 1·26·77 | 1·26·77 | 1·27·77 | 1·27·77 |
| Final Wt. 250 | 1 | 100.0968 | 102.0026 | 100.1885 | 100.9386 | 99.8103 | 0.8375 | 0.8035 |
| | 2 | 100.0969 | 102.0029 | 100.1885 | 100.9384 | 99.8104 | 0.8374 | 0.8037 |
| | 3 | | | | | | | |
| | 4 | | | | | | | |
| | 5 | | | | | | | |
| | 6 | | | | | | | |
| | Avg | 100.0969 | 102.0028 | 100.1885 | 100.9385 | 99.8104 | 0.8375 | 0.8036 |
| Residue wt Final 250-Tare | | 0.0193 | 0.0185 | 0.0035 | 0.0019 | 0.0010 | 0.0374 | 0 |
| Date Weighed or 650 Bake | | | | | | | | |
| Final Wt. 650 | 1 | | | | | | | |
| | 2 | | | | | | | |
| | 3 | | | | | | | |
| | 4 | | | | | | | |
| | 5 | | | | | | | |
| | 6 | | | | | | | |
| | Avg | | | | | | | |
| Residue Wt Final 650-Tare | | | | | | | | |

Comments:

Data Sheet 6002-3

## PARTICULATE EMISSION CALCULATIONS

Test No. 19-116 Date 1-26-77 Location 19 Engr. G Salter

Unit No. 1 Fuel #2 oil Sampling Train and Method Method 5

Pitot Factor, Fs 0.83 Barometric Pressure, $P_{bar}$ 29.72 in. Hg

Tot. Liquid Collected, $V_{1c}$ 150.8 ml Total Particulate, $M_n$ 67.6 = gm Total

Velocity Head, ΔP 0.126 iwg Stack Temp., Ts 969 °R Stack Area, As 4.9 $ft^2$

Sample Volume, Vm 60.0 $ft^3$ Stack Press., Psg -0.225 iwg Excess $O_2$, $XO_2$% 3.1 %

Orifice Press. Diff., H 1.62 iwg Stack Gas Sp. Gravity, Gs ______ n.d.

Sample Time, θ 67 min Nozzle Dia., Dn 1/2 in. Meter Temp., $T_m$ ______ °R

*1. Sample Gas Volume $Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$ 59.8 SCF

2. Water Vapor $Vw_{std} = 0.0474\ V_{1c}$ 7.12 SCF

3. Moisture Content Bwo = Eq. 2/(Eq. 1 + Eq. 2) 0.106 N.D.

4. Concentration a. $C = 0.0154\ Mn/Vm_{std}$ 0.0174 grains/DSCF

b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$ $2.493 \times 10^{-6}$ lb/DSCF

c. $C = \text{Eq. 4b} \times 16.018 \times 10^{3}$ $3.993 \times 10^{-2}$ grams/DSCM

5. Abs. Stack Press. $Ps = P_{bar} \times 13.6 + Psg$ 403.97 in. w abs.

6. Stack Gas Speed $Vs = 174\ Fs\ \sqrt{\Delta P Ts}\sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$ 1602 ft/min

7. Stack Gas Flow Rate @ 70°F a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$ 4261 WSCF/min

b. Qsd = Eq. 7a x (1. - Eq. 3) 3809 DSCF/min

8. Material Flow Ms = Eq. 7b x Eq. 4b x 60 0.5698 lb/hr

9. $XO_2$ factor $XO_2f = 2090/(20.9 - XO_2\%)$ 117.4 N.D.

10. Emission a. E = Eq. 4b x Fe x Eq. 9 $2.70 \times 10^{-2}$ lb/MMBtu

b. E = Eq. 4c x Fm x Eq. 9 x 1000 11.60 ng/joule

11. % Isokinetic $I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$ 84.2 %

| | Oil | Gas | Coal |
|---|---|---|---|
| Fe SC Feet/$10^4$ Btu | 92.2 | 87.4 | 98.2 |
| Fm SC Meters/$10^4$ joules | 0.002475 | 0.002346 | 0.002636 |

*Multiply $Vm_{std}$ by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

PLANT
LOCATION 19
OPERATOR
DATE 2/17/77
RUN NO. 19-132 No 6 oil
SAMPLE BOX NO.
METER BOX NO. 4-11-1071
METER H
C FACTOR @
ANDERSON IMPACTOR

METHOD 5 CONTROL CONSOLE READINGS

SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE 19°C
BAROMETRIC PRESSURE 30.12 in Hg
ASSUMED MOISTURE, %
HEATER BOX SETTING
PROBE LENGTH, IN.
NOZZLE DIAMETER, IN. 3/8
PROBE HEATER SETTING

| Traverse Point Number | Sampling Time (e) Min. | Static Pressure ($P_s$), ~~In. Hg.~~ iwg | Stack Temperature ($T_s$) °F | Velocity Head ($P_s$) iwg | Pressure Differential Across Orifice Meter ($\Delta H$), In. $H_2O$ | Gas Sample Volume Meter Reading ~~($V_m$) ft$^3$~~ | Gas Sample Temperature at Dry Gas Meter: Inlet ($T_{min.}$) °F | Gas Sample Temperature at Dry Gas Meter: Outlet ($T_{mout}$) °F | Sample Box Temprtature °F | Temperature of Gas Leaving Condenser on Last Impinger °F |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1122 | NA | 475 | 0.08 | 0.7 | 2706.00 | 110 | NA | NA | 60 |
| | 1132 | ↓ | ↓ | ↓ | ↓ | 2712.00 | 110 | ↓ | ↓ | 55 |
| | 1142 | ↓ | ↓ | ↓ | ↓ | 2718.00 | 110 | ↓ | ↓ | 55 |
| | 1147 | ↓ | ↓ | ↓ | ↓ | 2721.00 | 115 | ↓ | ↓ | 55 |
| | 25 min | | | | | 15.00 | | | | |
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| | | | | | | | | | | |
| TOTAL | | | | | | | | AVG. | AVG. | |
| AVERAGE | | | | | | | | AVG. | | |

## ANDERSEN CASCADE IMPACTOR DATA

Test No. 19-132 Location 19 Owner

Impactor No. 1 Nozzle Size 3/8 Filter No.

Stack Temperature 475 °F Impactor Flow Rate 0.605 CFM

temp. correction factor · 1.24

| Plate | Tare (g) | Final (g) | Net (g) | % | Cum. % | ECD (μ) |
|---|---|---|---|---|---|---|
| 1 | 27.3071 | 27.3110 | 0.0039 | 11.9 | 99.9 | (12.5) 15.5 |
| 2 | 28.4148 | 28.4187 | 0.0039 | 11.9 | 88.0 | (7.8) 9.7 |
| 3 | 29.2157 | 29.2194 | 0.0037 | 11.3 | 76.1 | (5.2) 6.4 |
| 4 | 21.9716 | 21.9744 | 0.0028 | 8.5 | 64.8 | (3.7) 4.6 |
| 5 | 17.8933 | 17.8961 | 0.0028 | 8.5 | 56.3 | (2.3) 2.9 |
| 6 | 17.9073 | 17.9102 | 0.0029 | 8.8 | 47.8 | (1.2) 1.5 |
| 7 | 18.0006 | 18.0032 | 0.0026 | 7.9 | 39.0 | (0.72) 0.9 |
| 8 | 28.4026 | 28.4053 | 0.0027 | 8.2 | 31.1 | (0.48) 0.6 |
| Back Up Filter | 21.7893 | 21.7968 | 0.0075 | 22.9 | | |

0.0328

Data Sheet 6002-5

## PARTICULATE EMISSION CALCULATIONS

Test No. 19-132 Date 7-17-77 Location 19 Engr. SOTTER

Unit No. 1 Fuel #6 Oil Sampling Train and Method Anderson Impactor

Pitot Factor, Fs .83 Barometric Pressure, $P_{bar}$ 30.12 in. Hg

Tot. Liquid Collected, $V_{1c}$ ______ ml Total Particulate, $M_n$ 32.8 m gm

Velocity Head, ΔP 1.08 iwg Stack Temp., Ts 935 °R Stack Area, As 4.9 $ft^2$

Sample Volume, Vm 15 $ft^3$ Stack Press., Psg -0.73 iwg Excess $O_2$, $XO_2$% .98 %

Orifice Press. Diff., H 0.7 iwg Stack Gas Sp. Gravity, Gs ______ n.d.

Sample Time, θ 25 min Nozzle Dia., Dn .375 in. Meter Temp., $T_m$ ______ °R

*1. Sample Gas Volume $Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$ 15.116 SCF 0.605 SCFM

2. Water Vapor $Vw_{std} = 0.0474\ V_{1c}$ 1.81 SCF

3. Moisture Content Bwo = Eq. 2/(Eq. 1 + Eq. 2) Meth 5 .1064 N.D.

4. Concentration a. $C = 0.0154\ Mn/Vm_{std}$ 0.0334 grains/DSCF

b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$ $4.785 \times 10^{-6}$ lb/DSCF

c. $C = \text{Eq. 4b} \times 16.018 \times 10^3$ 0.0766 grams/DSCM

5. Abs. Stack Press. $Ps = P_{bar} \times 13.6 + Psg$ 409.4 in. w abs.

6. Stack Gas Speed $Vs = 174\ Fs\ \sqrt{\Delta P Ts}\ \sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$ 1245 ft/min

7. Stack Gas Flow Rate @ 70°F a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$ 3479 WSCF/min

b. Qsd = Eq. 7a x (1. - Eq. 3) 3107 DSCF/min

8. Material Flow Ms = Eq. 7b x Eq. 4b x 60 0.892 lb/hr

9. $XO_2$ factor $XO_2f = 2090/(20.9 - XO_2\%)$ 104.9 N.D.

10. Emission a. E = Eq. 4b x Fe x Eq. 9 0.046 lb/MMBtu

b. E = Eq. 4c x Fm x Eq. 9 x 1000 19.9 ng/joule

11. % Isokinetic $I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$ 124 %

| | Oil | Gas | Coal |
|---|---|---|---|
| Fe SC Feet/$10^4$ Btu | 92.2 | 87.4 | 98.2 |
| Fm SC Meters/$10^4$ joules | 0.002475 | 0.002346 | 0.002636 |

*Multiply $Vm_{std}$ by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

PLANT
LOCATION 19
OPERATOR
DATE 2-17-77
RUN NO. 19-132
SAMPLE BOX NO. 1
METER BOX NO. 4-11-1091
METER H
C FACTOR @ 0.83

METHOD 5 CONTROL CONSOLE READINGS

SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE 17 °F
BAROMETRIC PRESSURE 30.12
ASSUMED MOISTURE, %
HEATER BOX SETTING
PROBE LENGTH, IN. 48
NOZZLE DIAMETER, IN. 0.5
PROBE HEATER SETTING

| Traverse Point Number | Sampling Time (e)Min. | Static Pressure ($P_s$), In. ~~Hg.~~ $H_2O$ | Stack Temperature ($T_s$) °F | Velocity Head ($P_s$) | Pressure Differential Across Orifice Meter ($\Delta H$), In. $H_2O$ | Gas Sample Volume ($V_m$) $ft^3$ | Gas Sample Temperature at Dry Gas Meter | | Sample Box Temprtature °F | Temperature of Gas Leaving Condenser on Last Impinger °F |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Inlet ($T_{min.}$) °F | Outlet ($T_{mout}$) °F | | |
| | 0950 | -0.23 | 465 | 0.0695 | 1.46 | 2645.99 | 80 | | 320 | 50 |
| | 1005 | | 470 | 0.0695 | 1.46 | 2660.00 | 85 | | 340 | 55 |
| | 1020 | | 475 | 0.0695 | 1.46 | 2673.0 | 90 | | 330 | 62 |
| | 1035 | | 475 | 0.0695 | 1.46 | 2686.0 | 100 | | 330 | 55 |
| | 1050 | | 475 | 0.0695 | 1.46 | 2698.0 | 105 | | 340 | 55 |
| | 1059:30 | | 490 | 0.0695 | 1.46 | 2705.99 | 110 | | 340 | 60 |
| | | | | | | | | | | |
| | | | | | | | | | | |
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| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| TOTAL | 69:30 | | | | | | | AVG. | AVG. | |
| AVERAGE | | | | 475 | | 60.0 | | AVG. | | |

## PARTICULATE CALCULATION SHEET

Test Crew R. Pionesso
Test No. 19-132 Date 2-17-77 Location 19
Box No. 1 Sample Probe Position
Test Description

Dry Gas Meter Vol. ($ft^3$)
Final 2705.90
Initial 2645.99
Total 60.0

Impinger Water Vol (ml)

| | 1 | 2 | 3 | S. Gel | Total |
|---|---|---|---|---|---|
| Final | 185 | 143 | 5 | 673 | 1006 |
| Initial | 100 | 100 | 0 | 653 | 853 |
| Δ Vol | 85 | 43 | 5 | 20 | 153 |

| Beaker No. | | 4 | 5 | 6 | Acetone Blank<br>7 | $H_2O$ Blank<br>8 | Filter No. 18 | Blank No. 19 |
|---|---|---|---|---|---|---|---|---|
| Date Weighed | | 1-27-77 | | | | | | |
| Tare Wt. | 1 | 99.2687 | 98.9367 | 100.4858 | 104.0069 | 99.3370 | 0.8033 | 0.8434 |
| | 2 | 99.2685 | 98.9366 | 100.4858 | 104.0068 | 99.3371 | 0.8034 | 0.8436 |
| | 3 | | | | | | | |
| | 4 | | | | | | | |
| | 5 | | | | | | | |
| | 6 | | | | | | | |
| | Avg | 99.2686 | 98.9367 | 100.4858 | 104.0069 | 99.3371 | 0.8034 | 0.8435 |
| Bottle No. | | 1 & 2 | 3 | 4 | | | | |
| Content | | Impinger (Water) | Probe (Acetone) | Probe (Water) | Cyclone ~~(Acetone)~~ | ~~Flask~~ (Dry) | | |
| Rinse (ml) | | 725 | 550 | 350 | 200 | 200 | | |
| Date Weighed or 250 Bake | | 2-21-77 | 2-18-77 | 2-18-77 | 2-18-77 | 2-18-77 | → | → |
| Final Wt. 250 | 1 | 99.2890 | 98.9668 | 100.4869 | 104.0062 | 99.3372 | 0.9428 | 0.8435 |
| | 2 | 99.2888 | 98.9668 | 100.4865 | 104.0063 | 99.3374 | 0.9428 | 0.8436 |
| | 3 | | | | | | | |
| | 4 | | | | | | | |
| | 5 | | | | | | | |
| | 6 | | | | | | | |
| | Avg | 99.2889 | 98.9668 | 100.4867 | 104.0063 | 99.3373 | 0.9428 | 0.8436 |
| Residue wt Final 250-Tare | | 0.0203 | 0.0301 | 0.0009 | 0 | 0.002 | 0.1394 | 0 |
| Date Weighed or 650 Bake | | | | | | | | |
| Final Wt. 650 | 1 | | | | | | | |
| | 2 | | | | | | | |
| | 3 | | | | | | | |
| | 4 | | | | | | | |
| | 5 | | | | | | | |
| | 6 | | | | | | | |
| | Avg | | | | | | | |
| Residue Wt Final 650-Tare | | | | | | | | |

Comments:

Data Sheet 6002-3

### TOTAL & SOLID PARTICULATE EMISSION CALCULATIONS

Test No. 19-132 Date 2-17-77 Location 19 Engr. Salter

Unit No. 1 Fuel #6 Sampling Train and Method Meth. 5

Pitot Factor, Fs 0.83 Barometric Pressure, $P_{bar}$ 30.12 in. Hg

Tot. Liquid Collected, $V_{1c}$ 153 ml Total Particulate, $M_n$ 196.7 Total 170.4 Solid m gm

Velocity Head, ΔP 0.0695 iwg Stack Temp., Ts 935 °R Stack Area, As 4.90 $ft^2$

Sample Volume, Vm 60.0 $ft^3$ Stack Press., Psg -0.23 iwg Excess $O_2$, $XO_2$% 0.98 %

Orifice Press. Diff., H 1.46 iwg Stack Gas Sp. Gravity, Gs ≈1 n.d.

Sample Time, θ 69.5 min Nozzle Dia., Dn 1/2 in. Meter Temp., $T_m$ ______ °R

| | | | TOTAL | SOLID | |
|---|---|---|---|---|---|
| *1. Sample Gas Volume | | $Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$ | | 60.5756 | SCF |
| 2. Water Vapor | | $Vw_{std} = 0.0474\ V_{1c}$ | | 7.2522 | SCF |
| 3. Moisture Content | | Bwo = Eq. 2/(Eq. 1 + Eq. 2) | | 0.1069 | N.D. |
| 4. Concentration | a. | $C = 0.0154\ Mn/Vm_{std}$ | 0.04848 | 0.0433 | grains/DSCF |
| | b. | $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$ | $6.94 \times 10^{-6}$ | $6.2 \times 10^{-6}$ | lb/DSCF |
| | c. | $C = \text{Eq. 4b} \times 16.018 \times 10^3$ | 0.111 | $9.935 \times 10^{-2}$ | grams/DSCM |
| 5. Abs. Stack Press. | | $Ps = P_{bar} \times 13.6 + Psg$ | | 409.40 | in. w abs. |
| 6. Stack Gas Speed | | $Vs = 174\ Fs \sqrt{\Delta P Ts} \sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$ | | 1160.78 | ft/min |
| 7. Stack Gas Flow Rate @ 70°F | a. | $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$ | | 3243.12 | WSCF/min |
| | b. | Qsd = Eq. 7a x (1. - Eq. 3) | | 2896.43 | DSCF/min |
| 8. Material Flow | | Ms = Eq. 7b x Eq. 4b x 60 | 1.206 | 1.0722 | lb/hr |
| 9. $XO_2$ factor | | $XO_2f = 2090/(20.9 - XO_2\%)$ | | 104.92 | N.D. |
| 10. Emission | a. | E = Eq. 4b x Fe x Eq. 9 | 0.0671 | 0.0600 | lb/MMBtu |
| | b. | E = Eq. 4c x Fm x Eq. 9 x 1000 | 28.87 | 25.80 | ng/joule |
| 11. % Isokinetic | | $I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$ | | 108.12 | % |

| | Oil | Gas | Coal |
|---|---|---|---|
| Fe SC Feet/$10^4$ Btu | 92.2 | 87.4 | 98.2 |
| Fm SC Meters/$10^4$ joules | 0.002475 | 0.002346 | 0.002636 |

*Multiply $Vm_{std}$ by $530/T_m$ (°R) if meter not temp. compensated.

Data Sheet 6002-4

## METHOD 5 CONTROL CONSOLE READINGS

PLANT ____
LOCATION ____
OPERATOR ____
DATE 2/21/77
RUN NO. 19-143 #6 Oil
SAMPLE BOX NO. ____
METER BOX NO. 4-11-1091
METER H ____
C FACTOR @ ____

AMBIENT TEMPERATURE 23°F
BAROMETRIC PRESSURE 29.69 in Hg
ASSUMED MOISTURE, % ____
HEATER BOX SETTING ____
PROBE LENGTH, IN. 3/8
NOZZLE DIAMETER, IN. ____
PROBE HEATER SETTING ____

SCHEMATIC OF STACK CROSS SECTION

ANDERSON IMPACTOR

| Traverse Point Number | Sampling Time (e) Min. | Static Pressure ($P_s$), ~~In. Hg.~~ iwg | Stack Temperature ($T_s$) °F | Velocity Head ($P_s$) iwg | Pressure Differential Across Orifice Meter ($\Delta H$), In. $H_2O$ | Gas Sample Volume Meter Reading ~~($V_m$ ft$^3$)~~ | Gas Sample Temperature at Dry Gas Meter: Inlet ($T_{min.}$) °F | Gas Sample Temperature at Dry Gas Meter: Outlet ($T_{mout}$) °F | Sample Box Temperature °F | Temperature of Gas Leaving Condenser on Last Impinger °F |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1155 | -0.2 | 485 | 0.089 | 0.56 | 2783.41 | 108 | NA | NA | 62 |
| | 1205 | ↓ | ↓ | ↓ | ↓ | 2789.00 | 108 | ↓ | ↓ | 58 |
| | 1215 | ↓ | ↓ | ↓ | ↓ | 2794.00 | 110 | ↓ | ↓ | 55 |
| | 1224 | ↓ | ↓ | ↓ | ↓ | 2798.41 | 110 | ↓ | ↓ | 55 |
| | 29 | | | | | 15.00 | | | | |
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| | | | | | | | | | | |
| TOTAL | | | | | | | | AVG. | AVG. | |
| AVERAGE | | | | | | | | AVG. | | |

ANDERSEN CASCADE IMPACTOR DATA

Test No. 19-143 Location 19 Owner

Impactor No. 1 Nozzle Size 3/8 in. Filter No.

Stack Temperature 485 °F Impactor Flow Rate 0.51 CFM

Temp. Corr. factor - 1.25

| Plate | Tare (g) | Final (g) | Net (g) | % | Cum. % | ECD (μ) |
|---|---|---|---|---|---|---|
| 1 | 27.3106 | 27.3150 | 0.0044 | 13.0 | 100.0 | (13.5) 16.9 |
| 2 | 28.4205 | 28.4254 | 0.0049 | 14.5 | 87.0 | (8.6) 10.8 |
| 3 | 29.2180 | 29.2224 | 0.0044 | 13.0 | 72.5 | (5.6) 7.0 |
| 4 | 21.9731 | 21.9762 | 0.0031 | 9.2 | 59.5 | (3.9) 4.9 |
| 5 | 17.8976 | 17.9007 | 0.0031 | 9.2 | 50.3 | (2.5) 3.1 |
| 6 | 17.9111 | 17.9137 | 0.0026 | 7.7 | 41.1 | (1.29) 1.6 |
| 7 | 18.0004 | 18.0029 | 0.0025 | 7.4 | 33.4 | (0.80) 1.0 |
| 8 | 28.4043 | 28.4065 | 0.0022 | 6.5 | 26.0 | (0.54) 0.7 |
| Back Up Filter | 21.7914 | 21.7980 | 0.0066 | 19.5 | | |

0.0338

Data Sheet 6002-5

## PARTICULATE EMISSION CALCULATIONS

Test No. 19-143 Date 2-21-77 Location 19 Engr. SOTTER

Unit No. 1 . Fuel #6 Oil Sampling Train and Method ________

Pitot Factor, Fs .83 Barometric Pressure, $P_{bar}$ 29.89 in. Hg

Tot. Liquid Collected, $V_{1c}$ ______ ml Total Particulate, $M_n$ 33.8 m gm

Velocity Head, ΔP 0.089 iwg Stack Temp., Ts 945 °R Stack Area, As 4.9 $ft^2$

Sample Volume, Vm 15.00 $ft^3$ Stack Press., Psg -0.2 iwg Excess $O_2$, $XO_2$% 3.1 %

Orifice Press. Diff., H 0.56 iwg Stack Gas Sp. Gravity, Gs ______ n.d.

Sample Time, θ 29 min Nozzle Dia., Dn .375 in. Meter Temp., $T_m$ 569 °R

*1. Sample Gas Volume $Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$ 15.0 SCF

2. Water Vapor $Vw_{std} = 0.0474\ V_{1c}$ 1.57 SCF

3. Moisture Content $Bwo = Eq.\ 2/(Eq.\ 1 + Eq.\ 2)$ Meth 5 0.095 N.D.

4. Concentration a. $C = 0.0154\ Mn/Vm_{std}$ 0.0347 grains/DSCF

b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$ $4.97 \times 10^{-6}$ lb/DSCF

c. $C = Eq.\ 4b \times 16.018 \times 10^3$ 0.0796 grams/DSCM

5. Abs. Stack Press. $Ps = P_{bar} \times 13.6 + Psg$ 406.3 in. w abs.

6. Stack Gas Speed $Vs = 174\ Fs\ \sqrt{\Delta P Ts}\sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$ 1325 ft/min

7. Stack Gas Flow Rate @ 70°F a. $Qsw = Eq.\ 6 \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$ 3636.7 WSCF/min

b. $Qsd = Eq.\ 7a \times (1. - Eq.\ 3)$ 3291 DSCF/min

8. Material Flow $Ms = Eq.\ 7b \times Eq.\ 4b \times 60$ 0.981 lb/hr

9. $XO_2$ factor $XO_2f = 2090/(20.9 - XO_2\%)$ 117.4 N.D.

10. Emission a. $E = Eq.\ 4b \times Fe \times Eq.\ 9$ 0.0538 lb/MMBtu

b. $E = Eq.\ 4c \times Fm \times Eq.\ 9 \times 1000$ 23.13 ng/joule

11. % Isokinetic $I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$ 100.4 %

| | Oil | Gas | Coal |
|---|---|---|---|
| Fe SC Feet/$10^4$ Btu | 92.2 | 87.4 | 98.2 |
| Fm SC Meters/$10^4$ joules | 0.002475 | 0.002346 | 0.002636 |

*Multiply $Vm_{std}$ by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

PLANT
LOCATION 19
OPERATOR R.P.
DATE 2-21-77
RUN NO. 19-143
SAMPLE BOX NO. 1
METER BOX NO. 4-11-1091
METER H
C FACTOR @ 0.83
Method 5

METHOD 5 CONTROL CONSOLE READINGS

SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE 21
BAROMETRIC PRESSURE 29.86
ASSUMED MOISTURE, %
HEATER BOX SETTING
PROBE LENGTH, IN. 48
NOZZLE DIAMETER, IN. 0.5
PROBE HEATER SETTING

| Traverse Point Number | Sampling Time (e) Min. | Static Pressure $(P_s)$, In. ~~Hg.~~ $H_2O$ | Stack Temperature $(T_s)$ °F | Velocity Head $(P_s)$ | Pressure Differential Across Orifice Meter $(\Delta H)$, In. $H_2O$ | Gas Sample Volume $(V_m)$ $ft^3$ | Gas Sample Temperature at Dry Gas Meter: Inlet $(T_{min.})$ °F | Gas Sample Temperature at Dry Gas Meter: Outlet $(T_{mout})$ °F | Sample Box Temprtature °F | Temperature of Gas Leaving Condenser on Last Impinger °F |
|---|---|---|---|---|---|---|---|---|---|---|
| | 10:33 | -0.2 | 475 | 0.089 | 1.63 | 2721.38 | 80 | | 310 | 50 |
| | 10:48 | | 480 | 0.089 | 1.63 | 2736.00 | 85 | | 330 | 60 |
| | 11:03 | | 483 | 0.089 | 1.63 | 2750.00 | 92 | | 330 | 60 |
| | 11:18 | | 485 | 0.089 | 1.63 | 2764.00 | 100 | | 330 | 57 |
| | 11:33 | | 490 | 0.089 | 1.63 | 2777.00 | 105 | | 340 | 55 |
| | 11:40 | | 490 | 0.089 | 1.63 | 2783.38 | 106 | | 340 | 55 |
| | | | | | | | | | | |
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| | | | | | | | | | | |
| TOTAL | 67 | | | | | 62.0 | | AVG. | AVG. | |
| AVERAGE | | | 487 | | | | | AVG. | | |

# PARTICULATE CALCULATION SHEET

Test Crew R P.

Test No. 19·143 Date 2·21·77 Location 19

Box No. 1 Sample Probe Position ℄

Test Description

---

Dry Gas Meter Vol. ($ft^3$)

Final 2783.38

Initial 2721.38

Total 62.00

Impinger Water Vol (ml)

| | 1 | 2 | 3 | S. Gel | Total |
|---|---|---|---|---|---|
| Final | 172 | 142 | 5 | 667.2 | 986.2 |
| Initial | 100 | 100 | 0 | 648.0 | 848.0 |
| Δ Vol | 72 | 42 | 5 | 19.2 | 138.2 |

| | | | | | | Filter No. | Blank No. |
|---|---|---|---|---|---|---|---|
| Beaker No. | | 1 | 3 | 9 | | 19 | 20 |
| Date Weighed | | 2·18·77 | → | | | 2·18·77 | 1·27·77 |
| Tare Wt. | 1 | 100.0790 | 101.9866 | 100.1860 | | 0.8435 | 0.8071 |
| | 2 | 100.0788 | 101.9863 | 100.1860 | | 0.8436 | 0.8071 |
| | 3 | | | | | | |
| | 4 | | | | | | |
| | 5 | | | | | | |
| | 6 | | | | | | |
| | Avg | 100.0789 | 101.9865 | 100.1860 | | 0.8436 | 0.8071 |
| Bottle No. | | 1 & 2 | 3 | 4 | | | |
| Content | | Impinger (Water) | Probe (Acetone) | Probe (Water) | Cyclone (Acetone) | Flask (Dry) | | |
| Rinse (ml) | | 750 | 425 | 350 | | | | |
| Date Weighed or 250 Bake | | 2·22·77 | 2·22·77 | 2·22·77 | | | 2·22·77 | 2·22·77 |
| Final Wt. 250 | 1 | 100.1069 | 102.0328 | 100.1969 | | | 0.9513 | 0.8074 |
| | 2 | 100.1068 | 102.0329 | 100.1967 | | | 0.9512 | 0.8074 |
| | 3 | | | | | | | |
| | 4 | | | | | | | |
| | 5 | | | | | | | |
| | 6 | | | | | | | |
| | Avg | 100.1069 | 102.0329 | 100.1968 | | | 0.9513 | 0.8074 |
| Residue wt Final 250-Tare | | 0.028 | 0.0464 | 0.0108 | | | 0.1077 | 0.0003 |
| Date Weighed or 650 Bake | | | | | | | | |
| Final Wt. 650 | 1 | | | | | | | |
| | 2 | | | | | | | |
| | 3 | | | | | | | |
| | 4 | | | | | | | |
| | 5 | | | | | | | |
| | 6 | | | | | | | |
| | Avg | | | | | | | |
| Residue Wt Final 650-Tare | | | | | | | | |

Comments:

Data Sheet 6002-3

# PARTICULATE EMISSION CALCULATIONS

Test No. 19-143 Date 2-21-77 Location 19 Engr. G. Setter

Unit No. 1 Fuel #6 oil Sampling Train and Method Method 5

Pitot Factor, Fs 0.83 Barometric Pressure, $P_{bar}$ 29.86 in. Hg

Tot. Liquid Collected, $V_{lc}$ 138.2 ml ~~Total~~ Particulate, $M_n$ 164.9 (192.9 Total) m gm solid

Velocity Head, ΔP 0.089 iwg Stack Temp., Ts 947 °R Stack Area, As 4.90 $ft^2$

Sample Volume, Vm 62.0 $ft^3$ Stack Press., Psg -0.2 iwg Excess $O_2$, $XO_2$% 3.1 %

Orifice Press. Diff., H 1.63 iwg Stack Gas Sp. Gravity, Gs ≈1 n.d.

Sample Time, θ 67 min Nozzle Dia., Dn 1/2 in. Meter Temp., $T_m$ °R

| | | TOTAL | SOLID | |
|---|---|---|---|---|
| *1. Sample Gas Volume | $Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$ | | 62.08 | SCF |
| 2. Water Vapor | $Vw_{std} = 0.0474\ V_{lc}$ | | 6.55 | SCF |
| 3. Moisture Content | Bwo = Eq. 2/(Eq. 1 + Eq. 2) | | 0.095 | N.D. |
| 4. Concentration | a. $C = 0.0154\ Mn/Vm_{std}$ | 0.0479 | 0.041 | grains/DSCF |
| | b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$ | $6.85 \times 10^{-6}$ | $5.86 \times 10^{-6}$ | lb/DSCF |
| | c. $C = \text{Eq. 4b} \times 16.018 \times 10^3$ | 0.1097 | $9.38 \times 10^{-2}$ | grams/DSCM |
| 5. Abs. Stack Press. | $Ps = P_{bar} \times 13.6 + Psg$ | | 405.9 | in. w abs. |
| 6. Stack Gas Speed | $Vs = 174\ Fs \sqrt{\Delta P Ts} \sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$ | | 1328 | ft/min |
| 7. Stack Gas Flow Rate @ 70°F | a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$ | | 3631 | WSCF/min |
| | b. Qsd = Eq. 7a x (1. - Eq. 3) | | 3286 | DSCF/min |
| 8. Material Flow | Ms = Eq. 7b x Eq. 4b x 60 | | 1.155 | lb/hr |
| 9. $XO_2$ factor | $XO_2f = 2090/(20.9 - XO_2\%)$ | | 117.4 | N.D. |
| 10. Emission | a. E = Eq. 4b x Fe x Eq. 9 | 0.074 | 0.0635 | lb/MMBtu |
| | b. E = Eq. 4c x Fm x Eq. 9 x 1000 | 31.8 | 27.2 | ng/joule |
| 11. % Isokinetic | $I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$ | | 101.3 | % |

| | Oil | Gas | Coal |
|---|---|---|---|
| Fe SC Feet/$10^4$ Btu | 92.2 | 87.4 | 98.2 |
| Fm SC Meters/$10^4$ joules | 0.002475 | 0.002346 | 0.002636 |

*Multiply $Vm_{std}$ by $530/T_m$ (°R) if meter not temp. compensated.

Data Sheet 6002-4

PLANT
LOCATION
OPERATOR
DATE 2/23/77
RUN NO. 19-159 #6 oil
SAMPLE BOX NO.
METER BOX NO. 4-11-1091
METER H
C FACTOR @

METHOD 5 CONTROL CONSOLE READINGS

AMBIENT TEMPERATURE 41°F
BAROMETRIC PRESSURE 30.09 in Hg
ASSUMED MOISTURE, %
HEATER BOX SETTING
PROBE LENGTH, IN. 3/8
NOZZLE DIAMETER, IN.
PROBE HEATER SETTING

ANDERSON IMPACTOR

SCHEMATIC OF STACK CROSS SECTION

| Traverse Point Number | Sampling Time (e)Min. | Static Pressure ($P_s$), ~~In. Hg.~~ iwg | Stack Temperature ($T_s$) °F | Velocity Head ($P_s$) iwg | Pressure Differential Across Orifice Meter ($\Delta H$), In. $H_2O$ | Gas Sample Volume Meter Reading ~~($V_m$) ft$^3$~~ | Gas Sample Temperature at Dry Gas Meter | | Sample Box Temprtature °F | Temperature of Gas Leaving Condenser on Last Impinger °F |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Inlet ($T_{min.}$) °F | Outlet ($T_{mout}$) °F | | |
| | 1115 | -0.23 | 530 | 0.089 | 0.54 | 2861.00 | 125 | NA | NA | 70 |
| | 1125 | | | | | 2866.00 | 120 | | | 62 |
| | 1135 | | | | | 2871.00 | 120 | | | 58 |
| | 1145 | | | | | 2876.00 | 118 | | | 58 |
| | 30 | | | | | 15.00 | | | | |
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| TOTAL | | | | | | | | AVG. | AVG. | |
| AVERAGE | | | | | | | | AVG. | | |

# ANDERSEN CASCADE IMPACTOR DATA

Test No. 19.159
Location 19
Owner
Impactor No. 1
Nozzle Size 3/8 in.
Filter No.
Stack Temperature 530 °F
Impactor Flow Rate 0.503 CFM
Temp. Correction Factor - 1.225

| Plate | Tare (g) | Final (g) | Net (g) | % | Cum. % | ECD (μ) |
|---|---|---|---|---|---|---|
| 1 | 27.3114 | 27.3163 | 0.0049 | 20.4 | 100.0 | (13.5) 16.5 |
| 2 | 28.4161 | 28.4205 | 0.0044 | 18.3 | 79.6 | (8.6) 10.5 |
| 3 | 29.2165 | 29.2200 | 0.0035 | 14.6 | 61.3 | (5.6) 6.9 |
| 4 | 21.9736 | 21.9759 | 0.0025 | 10.4 | 46.7 | (3.9) 4.8 |
| 5 | 17.8966 | 17.8988 | 0.0022 | 9.2 | 36.3 | (2.5) 3.1 |
| 6 | 17.9116 | 17.9131 | 0.0015 | 6.3 | 27.1 | (1.45) 1.8 |
| 7 | 18.0010 | 18.0018 | 0.0008 | 3.3 | 20.8 | (0.80) 1.0 |
| 8 | 28.4047 | 28.4055 | 0.0034 | 14.2 | | |
| Back Up Filter | | | | | | |

Total 0.0240

Data Sheet 6002-5

## PARTICULATE EMISSION CALCULATIONS

Test No. 19-159 Date 2-23-77 Location 19 Engr. ScTTER

Unit No. 1 Fuel #6 Oil Sampling Train and Method Anderson Impactor

Pitot Factor, Fs .83 Barometric Pressure, $P_{bar}$ 30.09 in. Hg

Tot. Liquid Collected, $V_{lc}$ ______ ml Total Particulate, $M_n$ 24.0 m gm

Velocity Head, ΔP 0.089 iwg Stack Temp., Ts 990 °R Stack Area, As 4.9 $ft^2$

Sample Volume, Vm 15.00 $ft^3$ Stack Press., Psg -.23 iwg Excess $O_2$, $XO_2$% 1.7 %

Orifice Press. Diff., H 0.54 iwg Stack Gas Sp. Gravity, Gs ______ n.d.

Sample Time, θ 30 min Nozzle Dia., Dn .375 in. Meter Temp., $T_m$ ______ °R

*1. Sample Gas Volume $Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$ 15.09 SCF

2. Water Vapor $Vw_{std} = 0.0474\ V_{lc}$ 1.85 SCF

3. Moisture Content Bwo = Eq. 2/(Eq. 1 + Eq. 2) .109 N.D.

4. Concentration a. $C = 0.0154\ Mn/Vm_{std}$ 0.0245 grains/DSCF

b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$ $3.507 \times 10^{-6}$ lb/DSCF

c. $C = \text{Eq. 4b} \times 16.018 \times 10^3$ 0.056 grams/DSCM

5. Abs. Stack Press. $Ps = P_{bar} \times 13.6 + Psg$ 408.99 in. w abs.

6. Stack Gas Speed $Vs = 174\ Fs\ \sqrt{\Delta P Ts}\sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$ 1352 ft/min

7. Stack Gas Flow Rate @ 70°F a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$ 3574 WSCF/min

b. Qsd = Eq. 7a x (1. - Eq. 3) 3184 DSCF/min

8. Material Flow Ms = Eq. 7b x Eq. 4b x 60 0.6699 lb/hr

9. $XO_2$ factor $XO_2f = 2090/(20.9 - XO_2\%)$ 108.85 N.D.

10. Emission a. E = Eq. 4b x Fe x Eq. 9 0.035 lb/MMBtu

b. E = Eq. 4c x Fm x Eq. 9 x 1000 15.1 ng/joule

11. % Isokinetic $I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$ 101.2 %

| | Oil | Gas | Coal |
|---|---|---|---|
| Fe SC Feet/$10^4$ Btu | 92.2 | 87.4 | 98.2 |
| Fm SC Meters/$10^4$ joules | 0.002475 | 0.002346 | 0.002636 |

*Multiply $Vm_{std}$ by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

PLANT
LOCATION 19
OPERATOR R.P.
DATE 2-23-77
RUN NO. 19-159
SAMPLE BOX NO. 1
METER BOX NO. 4-11-1091
METER H
C FACTOR @ 0.83

METHOD 5

## METHOD 5 CONTROL CONSOLE READINGS

SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE 41°F
BAROMETRIC PRESSURE 30.08
ASSUMED MOISTURE, %
HEATER BOX SETTING
PROBE LENGTH, IN. 4 ft.
NOZZLE DIAMETER, IN. ½"
PROBE HEATER SETTING

| Traverse Point Number | Sampling Time (e)Min. | Static Pressure ($P_s$), In. ~~Hg.~~ $H_2O$ | Stack Temperature ($T_s$) °F | Velocity Head ($P_s$) | Pressure Differential Across Orifice Meter ($\Delta H$), In. $H_2O$ | Gas Sample Volume ($V_m$) ft$^3$ | Gas Sample Temperature at Dry Gas Meter | | Sample Box Temprtature °F | Temperature of Gas Leaving Condenser on Last Impinger °F |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Inlet ($T_{min.}$) °F | Outlet ($T_{mout}$) °F | | |
| | 0951 | -0.23 | 505 | 0.089 | 1.57 | 2788.64 | | 100 | 310 | 60 |
| | 1006 | | 530 | 0.089 | 1.57 | | | 110 | 320 | 58 |
| | 1021 | | 530 | 0.089 | 1.57 | | | 115 | 335 | 60 |
| | 1036 | | 530 | 0.089 | 1.57 | | | 122 | 330 | 55 |
| | 1051 | | 530 | 0.089 | 1.57 | | | 125 | 350 | 60 |
| | 1103 | | 530 | 0.089 | 1.57 | 2860.64 | | 125 | 350 | 60 |
| | | | | | | | | | | |
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| | | | | | | | | | | |
| TOTAL | 63 | | | | | 62.0 | | AVG. | AVG. | |
| AVERAGE | | | 526 | | | | | | | |

## PARTICULATE CALCULATION SHEET

Test Crew R. P.

Test No. 19-159 Date 2-23-77 Location 19

Box No.
Sample Probe Position

Test Description

Dry Gas Meter Vol. (ft$^3$)

Final 2860.64

Initial 2798.64

Total 62.0

Impinger Water Vol (ml)

|  | 1 | 2 | 3 | S. Gel | Total |
|---|---|---|---|---|---|
| Final | 209 | 135 | 2 | 659.0 | 1005.0 |
| Initial | 100 | 100 | [illegible] | 643.6 | 843.6 |
| Δ Vol | 109 | 35 | 2 | 15.4 | 161.4 |

|  |  |  |  |  |  | Filter No. 20 | Blank No. 21 |
|---|---|---|---|---|---|---|---|
| Beaker No. | 10 | 11 | 12 |  |  |  |  |
| Date Weighed | 2-18-77 | → | → |  |  | 2-22-77 | 1-27-77 |
| Tare Wt. 1 | 100.9370 | 99.8094 | 100.9694 |  |  | 0.8074 | 0.8211 |
| 2 | 100.9372 | 99.8094 | 100.9692 |  |  | 0.8074 | 0.8211 |
| 3 |  |  |  |  |  |  |  |
| 4 |  |  |  |  |  |  |  |
| 5 |  |  |  |  |  |  |  |
| 6 |  |  |  |  |  |  |  |
| Avg | 100.9371 | 99.8094 | 100.9693 |  |  | 0.8074 | 0.8211 |
| Bottle No. | 1 & 2 | 3 | 4 |  |  |  |  |
| Content | Impinger (Water) | Probe (Acetone) | Probe (Water) | Cyclone (Acetone) | Flask (Dry) |  |  |
| Rinse (ml) | 750 | 485 | 275 |  |  |  |  |
| Date Weighed or 250 Bake | 2-24-77 | → | → |  |  | 2-24-77 | 2-24-77 |
| Final Wt. 250 1 | 100.9565 | 99.8425 | 100.9742 |  |  | 0.9623 | 0.8211 |
| 2 | 100.9566 | 99.8427 | 100.9742 |  |  | 0.9623 | 0.8211 |
| 3 |  |  |  |  |  |  |  |
| 4 |  |  |  |  |  |  |  |
| 5 |  |  |  |  |  |  |  |
| 6 |  |  |  |  |  |  |  |
| Avg | 100.9566 | 99.8426 | 100.9742 |  |  | 0.9623 | 0.8211 |
| Residue wt Final 250-Tare | 0.0195 | 0.0332 | 0.0049 |  |  | 0.1549 | 0 |
| Date Weighed or 650 Bake |  |  |  |  |  |  |  |
| Final Wt. 650 1 |  |  |  |  |  |  |  |
| 2 |  |  |  |  |  |  |  |
| 3 |  |  |  |  |  |  |  |
| 4 |  |  |  |  |  |  |  |
| 5 |  |  |  |  |  |  |  |
| 6 |  |  |  |  |  |  |  |
| Avg |  |  |  |  |  |  |  |
| Residue Wt Final 650-Tare |  |  |  |  |  |  |  |

Comments: 0.193g solids
0.2125g Total

Data Sheet 6002-3

## PARTICULATE EMISSION CALCULATIONS

Test No. 19-159 Date 2-23-77 Location 19 Engr. G. S.

Unit No. 1 Fuel #6 oil Sampling Train and Method Meth. 5

Pitot Factor, Fs 0.83 Barometric Pressure, $P_{bar}$ 30.08 in. Hg

Tot. Liquid Collected, $V_{1c}$ 161.4 ml Total Particulate, $M_n$ 212.5 Total 193 Solid gm

Velocity Head, ΔP 0.089 iwg Stack Temp., Ts 986 °R Stack Area, As 4.90 $ft^2$

Sample Volume, Vm 62 $ft^3$ Stack Press., Psg -0.23 iwg Excess $O_2$, $XO_2$% 1.7 %

Orifice Press. Diff., H 1.57 iwg Stack Gas Sp. Gravity, Gs 1 n.d.

Sample Time, θ 63 min Nozzle Dia., Dn 1/2 in. Meter Temp., $T_m$ ______ °R

| | | | Total | Solid | |
|---|---|---|---|---|---|
| *1. Sample Gas Volume | | $Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$ | | 62.5287 | SCF |
| 2. Water Vapor | | $Vw_{std} = 0.0474\ V_{1c}$ | | 7.6504 | SCF |
| 3. Moisture Content | | Bwo = Eq. 2/(Eq. 1 + Eq. 2) | | 0.1090 | N.D. |
| 4. Concentration | a. | $C = 0.0154\ Mn/Vm_{std}$ | 0.0523 | 0.0463 | grains/DSCF |
| | b. | $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$ | $7.494 \times 10^{-6}$ | $6.633 \times 10^{-6}$ | lb/DSCF |
| | c. | $C = \text{Eq. 4b} \times 16.018 \times 10^3$ | 0.120 | 0.1062 | grams/DSCM |
| 5. Abs. Stack Press. | | $Ps = P_{bar} \times 13.6 + Psg$ | | 408.858 | in. w abs. |
| 6. Stack Gas Speed | | $Vs = 174\ Fs \sqrt{\Delta PTs} \sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$ | | 1349.81 | ft/min |
| 7. Stack Gas Flow Rate @ 70°F | a. | $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$ | | 3571.45 | WSCF/min |
| | b. | Qsd = Eq. 7a x (1. - Eq. 3) | | 3182.12 | DSCF/min |
| 8. Material Flow | | Ms = Eq. 7b x Eq. 4b x 60 | | 1.2664 | lb/hr |
| 9. $XO_2$ factor | | $XO_2f = 2090/(20.9 - XO_2\%)$ | | 108.85 | N.D. |
| 10. Emission | a. | E = Eq. 4b x Fe x Eq. 9 | 0.075 | 0.0683 | lb/MMBtu |
| | b. | E = Eq. 4c x Fm x Eq. 9 x 1000 | 32.33 | 29.36 | ng/joule |
| 11. % Isokinetic | | $I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$ | | 112.1 | % |

| | Oil | Gas | Coal |
|---|---|---|---|
| Fe SC Feet/$10^4$ Btu | 92.2 | 87.4 | 98.2 |
| Fm SC Meters/$10^4$ joules | 0.002475 | 0.002346 | 0.002636 |

*Multiply $Vm_{std}$ by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

PLANT
LOCATION 19
OPERATOR
DATE 3-1-77
RUN NO. 19-170
SAMPLE BOX NO.
METER BOX NO.
METER H
C FACTOR @

#6 oil

## METHOD 5 CONTROL CONSOLE READINGS

SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE 35°F
BAROMETRIC PRESSURE ~29.98 in Hg
ASSUMED MOISTURE, % ~13%
HEATER BOX SETTING
PROBE LENGTH, IN. 3/8
NOZZLE DIAMETER, IN.
PROBE HEATER SETTING

ANDERSON IMPACTOR

| Traverse Point Number | Sampling Time (e)Min. | Static Pressure ($P_s$), ~~In. Hg~~ iwg | Stack Temperature ($T_s$) °F | Velocity Head ($P_s$) iwg | Pressure Differential Across Orifice Meter ($\Delta H$), In. $H_2O$ | Gas Sample Volume Meter Reading ~~($V_m$) ft$^3$~~ | Gas Sample Temperature at Dry Gas Meter | | Sample Box Temprtature °F | Temperature of Gas Leaving Condenser on Last Impinger °F |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Inlet ($T_{min.}$) °F | Outlet ($T_{mout}$) °F | | |
| | 1332 | -0.22 | 512 | 0.115 | 0.61 | 2936.560 | 118 | NA | NA | NA |
| | 1342 | ↓ | ↓ | ↓ | ↓ | 42.0 | 119 | ↓ | ↓ | ↓ |
| | 1352 | ↓ | ↓ | ↓ | ↓ | 48.0 | 121 | ↓ | ↓ | ↓ |
| | 1402 | ↓ | ↓ | ↓ | ↓ | 2952.350 | 121 | ↓ | ↓ | ↓ |
| | | | | | | | | | | |
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| | | | | | | | | | | |
| TOTAL | | | | | | | | AVG. | AVG. | |
| AVERAGE | | | | | | | | AVG. | | |

# ANDERSEN CASCADE IMPACTOR DATA

Test No. 19-170 Location 19 Owner

Impactor No. 1 Nozzle Size 3/8" Filter No.

Stack Temperature 512 °F Impactor Flow Rate 0.53 CFM

Temp. Corr Factor - 1.25

| Plate | Tare (g) | Final (g) | Net (g) | % | Cum. % | ECD (μ) |
|---|---|---|---|---|---|---|
| 1 | 27.3112 | 27.3164 | 0.0052 | 20.0 | 100.0 | (13.5) 16.9 |
| 2 | 28.4177 | 28.4219 | 0.0042 | 16.1 | 80.0 | (8.5) 10.6 |
| 3 | 29.2172 | 29.2208 | 0.0036 | 13.8 | 63.9 | (5.6) 7.0 |
| 4 | 21.9727 | 21.9752 | 0.0025 | 9.6 | 50.1 | (3.8) 4.75 |
| 5 | 17.8941 | 17.8962 | 0.0021 | 8.1 | 40.5 | (2.5) 3.1 |
| 6 | 17.9089 | 17.9107 | 0.0018 | 6.9 | 32.4 | (1.25) 1.6 |
| 7 | 18.0042 | 18.0057 | 0.0015 | 5.8 | 25.5 | (0.76) 0.95 |
| 8 | 28.4035 | 28.4051 | 0.0016 | 6.2 | 19.7 | (0.53) 0.66 |
| Back Up Filter | 21.7916 | 21.7948 | 0.0035 | 13.5 | | |

Total 0.0260

Data Sheet 6002-5

## PARTICULATE EMISSION CALCULATIONS

Test No. 14-170 Date 3-1-77 Location 19 Engr. SETTER

Unit No. 1 Fuel #6 Oil Sampling Train and Method ____

Pitot Factor, Fs .83 Barometric Pressure, $P_{bar}$ 29.98 in. Hg

Tot. Liquid Collected, $V_{lc}$ ____ ml Total Particulate, $M_n$ 26.0 m gm

Velocity Head, ΔP 0.115 iwg Stack Temp., Ts 972 °R Stack Area, As 4.9 $ft^2$

Sample Volume, Vm 15.79 $ft^3$ Stack Press., Psg -.22 iwg Excess $O_2$, $XO_2$% 4.2 %

Orifice Press. Diff., H 0.61 iwg Stack Gas Sp. Gravity, Gs ____ n.d.

Sample Time, θ 30 min Nozzle Dia., Dn .375 in. Meter Temp., $T_m$ 580 °R

| | | | | |
|---|---|---|---|---|
| *1. | Sample Gas Volume | $Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$ | 15.84 | SCF |
| 2. | Water Vapor | $Vw_{std} = 0.0474\ V_{lc}$ | 1.31 | SCF |
| 3. | Moisture Content | Bwo = Eq. 2/(Eq. 1 + Eq. 2) | .091 | N.D. |
| 4. | Concentration | a. $C = 0.0154\ Mn/Vm_{std}$ | 0.0253 | grains/DSCF |
| | | b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$ | $3.62 \times 10^{-6}$ | lb/DSCF |
| | | c. $C = \text{Eq. 4b} \times 16.018 \times 10^3$ | 0.058 | grams/DSCM |
| 5. | Abs. Stack Press. | $Ps = P_{bar} \times 13.6 + Psg$ | 407.5 | in. w abs. |
| 6. | Stack Gas Speed | $Vs = 174\ Fs\ \sqrt{\Delta PTs}\sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$ | 1526 | ft/min |
| 7. | Stack Gas Flow Rate @ 70°F | a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$ | 4082 | WSCF/min |
| | | b. Qsd = Eq. 7a x (1. - Eq. 3) | 3710 | DSCF/min |
| 8. | Material Flow | Ms = Eq. 7b x Eq. 4b x 60 | 0.806 | lb/hr |
| 9. | $XO_2$ factor | $XO_2f = 2090/(20.9 - XO_2\%)$ | 125.1 | N.D. |
| 10. | Emission | a. E = Eq. 4b x Fe x Eq. 9 | 0.0418 | lb/MMBtu |
| | | b. E = Eq. 4c x Fm x Eq. 9 x 1000 | 17.96 | ng/joule |
| 11. | % Isokinetic | $I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$ | 99.5 | % |

| | Oil | Gas | Coal |
|---|---|---|---|
| Fe SC Feet/$10^4$ Btu | 92.2 | 87.4 | 98.2 |
| Fm SC Meters/$10^4$ joules | 0.002475 | 0.002346 | 0.002636 |

*Multiply $Vm_{std}$ by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

PLANT
LOCATION 19
OPERATOR MBH
DATE 3-1-77
RUN NO. 19-170
SAMPLE BOX NO. 1
METER BOX NO. 1
METER H
C FACTOR @ 0.83
Method 5

METHOD 5 CONTROL CONSOLE READINGS

AMBIENT TEMPERATURE 35 °F
BAROMETRIC PRESSURE 29.98
ASSUMED MOISTURE, % ~13
HEATER BOX SETTING
PROBE LENGTH, IN. 72
NOZZLE DIAMETER, IN. 1/2
PROBE HEATER SETTING 5

SCHEMATIC OF STACK CROSS SECTION

| Traverse Point Number | Sampling Time (e) Min. | Static Pressure ($P_s$), In. ~~Hg.~~ $H_2O$ | Stack Temperature ($T_s$) °F | Velocity Head ($P_s$) | Pressure Differential Across Orifice Meter ($\Delta H$), In. $H_2O$ | Gas Sample Volume ($V_m$) ft$^3$ | Gas Sample Temperature at Dry Gas Meter | | Sample Box Temprtature °F | Temperature of Gas Leaving Condenser on Last Impinger °F |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Inlet ($T_{min.}$) °F | Outlet ($T_{mout}$) °F | | |
| | 1123 | -0.22 | 515 | 0.11 | 1.77 | 2876.205 | | 90 | 345 | 60 |
| | 1138 | | 518 | 0.11 | 1.77 | | | 93 | 390 | 72 |
| | 1152 | | 520 | 0.11 | 1.77 | | | 101 | 405 | 68 |
| | 1207 | | 520 | 0.11 | 1.77 | | | 108 | 425 | 64 |
| | 1223 | | 521 | 0.11 | 1.77 | | | 116 | 425 | 65 |
| | 1228 | | 521 | 0.11 | 1.77 | 2936.510 | | 120 | 420 | 66 |
| | | | | | | | | | | |
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| | | | | | | | | | | |
| | | | | | | | | | | |
| TOTAL | | | | | | | | AVG. | AVG. | |
| AVERAGE | | | 519 | | | | | AVG. | | |

## PARTICULATE CALCULATION SHEET

Test Crew GS, MBH

Test No. 19-170 Date 3-1-77 Location 19

Box No. 1 Sample Probe Position stack, ~15" in

Test Description 100% FGR, low $O_2$

---

Dry Gas Meter Vol. (ft$^3$)

Final 2936.510

Initial 2876.205

Total 60.305

Impinger Water Vol (ml)

| | 1 | 2 | 3 | S. Gel | Total |
|---|---|---|---|---|---|
| Final | 168 | 137 | 5 | 614.0 | 924 |
| Initial | 100 | 100 | 0 | 596.4 | 796.4 |
| Δ Vol | 68 | 37 | 5 | 18.4 | 127.6 |

| Beaker No. | 1 | 3 | | H₂O Blank 5 | Acetone Blank 6 | Filter No. 21 | Blank No. 22 |
|---|---|---|---|---|---|---|---|
| Date Weighed | 2-24-77 → | | | 2-21-77 → | | 2-24-77 | 1-27-77 |
| Tare Wt. 1 | 100.0762 | 101.9828 | | 98.9317 | 100.4825 | 0.8211 | 0.7962 |
| 2 | 100.0761 | 101.9828 | | 98.9315 | 100.4823 | 0.8211 | 0.7944 |
| 3 | | | | | | | |
| 4 | | | | | | | |
| 5 | | | | | | | |
| 6 | | | | | | | |
| Avg | 100.0762 | 101.9828 | | 98.9316 | 100.4824 | 0.8211 | 0.7943 |
| Bottle No. | 1 & 2 | 3 | | H₂O | Acet. | | |
| Content | Impinger (Water) | Probe (Acetone) | Probe (Water) | ~~Cyclone (Acetone)~~ | ~~Flask (Dry)~~ | | |
| Rinse (ml) | 765 | 475 | | 200 | 200 | | |
| Date Weighed or 250 Bake | 3-2-77 | 3-2-77 | | 3-2-77 | 3-2-77 | 3-2-77 | 3-2-77 |
| Final Wt. 250 1 | 100.1916 | 102.0269 | | 98.9321 | 100.4839 | 0.9181 | 0.7942 |
| 2 | 100.1916 | 102.0271 | | 98.9324 | 100.4838 | 0.9181 | 0.7942 |
| 3 | | | | 98.9324 | | | |
| 4 | | | | | | | |
| 5 | | | | | | | |
| 6 | | | | | | | |
| Avg | 100.1916 | 100.0270 | | 98.9324 | 100.4838 | 0.9181 | 0.7942 |
| Residue wt Final 250-Tare | 0.1154 | 0.0442 | | +0.0008 | +0.0014 | 0.0097 | -0.0001 |
| Date Weighed or 650 Bake | | | | | | | |
| Final Wt. 650 1 | | | | | | | |
| 2 | | | | | | | |
| 3 | | | | | | | |
| 4 | | | | | | | |
| 5 | | | | | | | |
| 6 | | | | | | | |
| Avg | | | | | | | |
| Residue Wt Final 650-Tare | | | | | | | |

Comments:

Data Sheet 6002-3

# PARTICULATE EMISSION CALCULATIONS

Test No. 19-170 Date 3-1-77 Location 19 Engr. G. S.

Unit No. 1 Fuel #6 oil Sampling Train and Method 5

Pitot Factor, Fs 0.83 Barometric Pressure, $P_{bar}$ 29.98 in. Hg

Tot. Liquid Collected, $V_{1c}$ 127.6 ml Total Particulate, $M_n$ 159.7 m gm solid 50.5

Velocity Head, ΔP 0.11 iwg Stack Temp., Ts 979 °R Stack Area, As 4.9 $ft^2$

Sample Volume, Vm 60.305 $ft^3$ Stack Press., Psg -0.22 iwg Excess $O_2$, $XO_2$% 4.2 %

Orifice Press. Diff., H 1.77 iwg Stack Gas Sp. Gravity, Gs 1 n.d.

Sample Time, θ 65 min Nozzle Dia., Dn 0.5 in. Meter Temp., $T_m$ ______ °R

| | | Solid | Total | |
|---|---|---|---|---|
| *1. Sample Gas Volume | $Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$ | | 60.65 | SCF |
| 2. Water Vapor | $Vw_{std} = 0.0474\ V_{1c}$ | | 6.05 | SCF |
| 3. Moisture Content | Bwo = Eq. 2/(Eq. 1 + Eq. 2) | | 0.091 | N.D. |
| 4. Concentration | a. $C = 0.0154\ Mn/Vm_{std}$ | 0.0128 | 0.0406 | grains/DSCF |
| | b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$ | $1.836 \times 10^{-6}$ | $5.806 \times 10^{-6}$ | lb/DSCF |
| | c. $C = \text{Eq. 4b} \times 16.018 \times 10^3$ | 0.0294 | $9.3 \times 10^{-2}$ | grams/DSCM |
| 5. Abs. Stack Press. | $Ps = P_{bar} \times 13.6 + Psg$ | | 407.5 | in. w abs. |
| 6. Stack Gas Speed | $Vs = 174\ Fs \sqrt{\Delta P Ts} \sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$ | | 1498 | ft/min |
| 7. Stack Gas Flow Rate @ 70°F | a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$ | | 3978 | WSCF/min |
| | b. Qsd = Eq. 7a x (1. - Eq. 3) | | 3616 | DSCF/min |
| 8. Material Flow | Ms = Eq. 7b x Eq. 4b x 60 | | 1.260 | lb/hr |
| 9. $XO_2$ factor | $XO_2f = 2090/(20.9 - XO_2\%)$ | | 125.1 | N.D. |
| 10. Emission | a. E = Eq. 4b x Fe x Eq. 9 | 0.021 | 0.067 | lb/MMBtu |
| | b. E = Eq. 4c x Fm x Eq. 9 x 1000 | 9.1 | 28.795 | ng/joule |
| 11. % Isokinetic | $I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$ | | 92.7 | % |

| | Oil | Gas | Coal |
|---|---|---|---|
| Fe SC Feet/$10^4$ Btu | 92.2 | 87.4 | 98.2 |
| Fm SC Meters/$10^4$ joules | 0.002475 | 0.002346 | 0.002636 |

*Multiply $Vm_{std}$ by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

PLANT
LOCATION 19
OPERATOR
DATE 3/3/77
RUN NO. 19-179 #2oil
SAMPLE BOX NO.
METER BOX NO. 4-11-1091
METER H
C FACTOR @

METHOD 5 CONTROL CONSOLE READINGS

AMBIENT TEMPERATURE 50°F
BAROMETRIC PRESSURE 30.27 in Hg
ASSUMED MOISTURE, %
HEATER BOX SETTING
PROBE LENGTH, IN.
NOZZLE DIAMETER, IN. 3/8
PROBE HEATER SETTING

ANDERSON IMPACTOR

SCHEMATIC OF STACK CROSS SECTION

| Traverse Point Number | Sampling Time (e) Min. | Static Pressure ($P_s$), ~~In. Hg~~ iwg | Stack Temperature ($T_s$) °F | Velocity Head ($P_s$) iwg | Pressure Differential Across Orifice Meter ($\Delta H$), In. $H_2O$ | Gas Sample Volume Meter Reading ~~($V_m$) ft~~ $ft^3$ | Gas Sample Temperature at Dry Gas Meter: Inlet ($T_{min.}$) °F | Gas Sample Temperature at Dry Gas Meter: Outlet ($T_{mout}$) °F | Sample Box Temprtature °F | Temperature of Gas Leaving Condenser on Last Impinger °F |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1340 | -0.23 | 540 | 0.11 | 0.59 | 3014.51 | 90 | NA | NA | 70 |
| | 1355 | | | | | 3023.00 | 90 | | | 69 |
| | .1410 | | | | | 3031.00 | 100 | | | 60 |
| | 1425 | | | | | 3040.00 | 105 | | | 60 |
| | 1440 | | | | | 3048.00 | 110 | | | 61 |
| | 1453 | ↓ | ↓ | ↓ | ↓ | 3054.51 | 115 | ↓ | ↓ | 70 |
| | 113 | | | | | 40.00 | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| TOTAL | | | | | | | | AVG. | AVG. | |
| AVERAGE | | | | | | | | AVG. | | |

## ANDERSEN CASCADE IMPACTOR DATA

Test No. 19-179 Location 19 Owner ________

Impactor No. 1 Nozzle Size 3/8 in. Filter No. ________

Stack Temperature 540 °F Impactor Flow Rate 0.58 CFM

Temp. Corr. Factor - 1.28

| Plate | Tare (g) | Final (g) | Net (g) | % | Cum. % | ECD (μ) |
|---|---|---|---|---|---|---|
| 1 | 27.3127 | 27.3172 | 0.0045 | 17.9 | 100.0 | (12.5) 16.0 |
| 2 | 28.4184 | 28.4228 | 0.0044 | 17.5 | 82.1 | (8.0) 10.2 |
| 3 | 29.2183 | 29.2220 | 0.0037 | 14.7 | 64.6 | (5.3) 6.8 |
| 4 | 21.9730 | 21.9762 | 0.0032 | 12.7 | 49.9 | (3.75) 4.8 |
| 5 | 17.8951 | 17.8981 | 0.0030 | 12.0 | 37.2 | (2.35) 3.0 |
| 6 | 17.9106 | 17.9131 | 0.0025 | 10.0 | 25.2 | (1.2) 1.5 |
| 7 | 18.0012 | 18.0032 | 0.0020 | 8.0 | 15.2 | (0.75) 0.96 |
| 8 | 28.4053 | 28.4071 | 0.0018 | 7.2 | 7.2 | (0.50) 0.6 |
| Back Up Filter | 21.7935 | 21.7931 | -0.0004 | | | |

0.0251

Data Sheet 6002-5

## PARTICULATE EMISSION CALCULATIONS

Test No. 19-179 Date 3-3-77 Location 19 Engr. ______

Unit No. ______ Fuel #2 oil Sampling Train and Method Anderson Impactor

Pitot Factor, Fs .83 Barometric Pressure, $P_{bar}$ 30.34 in. Hg

Tot. Liquid Collected, $V_{lc}$ ______ ml Total Particulate, $M_n$ 25.1 m gm

Velocity Head, $\Delta P$ 0.11 iwg Stack Temp., Ts 1000 °R Stack Area, As 4.9 $ft^2$

Sample Volume, Vm 40. $ft^3$ Stack Press., Psg -.23 iwg Excess $O_2$, $XO_2$% 3.5 %

Orifice Press. Diff., H .59 iwg Stack Gas Sp. Gravity, Gs ______ n.d.

Sample Time, $\theta$ 113 min Nozzle Dia., Dn .375 in. Meter Temp., $T_m$ ______ °R

*1. Sample Gas Volume $Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$ 40.59 SCF

2. Water Vapor $Vw_{std} = 0.0474\ V_{lc}$ 6.33 SCF

3. Moisture Content Bwo = Eq. 2/(Eq. 1 + Eq. 2) .135 N.D.

4. Concentration a. $C = 0.0154\ Mn/Vm_{std}$ 0.00952 grains/DSCF

b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$ $1.364 \times 10^{-6}$ lb/DSCF

c. $C = \text{Eq. 4b} \times 16.018 \times 10^3$ 0.0218 grams/DSCM

5. Abs. Stack Press. $Ps = P_{bar} \times 13.6 + Psg$ 412.39 in. w abs.

6. Stack Gas Speed $Vs = 174\ Fs\ \sqrt{\Delta P Ts}\ \sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$ 1505 ft/min

7. Stack Gas Flow Rate @ 70°F a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$ 3960 WSCF/min

b. Qsd = Eq. 7a x (1. - Eq. 3) 3611 DSCF/min

8. Material Flow Ms = Eq. 7b x Eq. 4b x 60 0.296 lb/hr.

9. $XO_2$ factor $XO_2f = 2090/(20.9 - XO_2\%)$ 120.1 N.D.

10. Emission a. E = Eq. 4b x Fe x Eq. 9 0.0151 lb/MMBtu

b. E = Eq. 4c x Fm x Eq. 9 x 1000 6.5 ng/joule

11. % Isokinetic $I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Fs \times Dn^2}$ 66.97 %

| | Oil | Gas | Coal |
|---|---|---|---|
| Fe SC Feet/$10^4$ Btu | 92.2 | 87.4 | 98.2 |
| Fm SC Meters/$10^4$ joules | 0.002475 | 0.002346 | 0.002636 |

*Multiply $Vm_{std}$ by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

PLANT
LOCATION 19
OPERATOR R.P.
DATE 3-3-77
RUN NO. 19-179
SAMPLE BOX NO. 1
METER BOX NO. 4-11-1091
METER H
C FACTOR @ 0.83

Method 5

METHOD 5 CONTROL CONSOLE READINGS

AMBIENT TEMPERATURE 40
BAROMETRIC PRESSURE 30.34
ASSUMED MOISTURE, %
HEATER BOX SETTING
PROBE LENGTH, IN. 48
NOZZLE DIAMETER, IN. 0.5
PROBE HEATER SETTING

SCHEMATIC OF STACK CROSS SECTION

| Traverse Point Number | Sampling Time (e)Min. | Static Pressure ($P_s$), In. ~~Hg.~~ $H_2O$ | Stack Temperature ($T_s$) °F | Velocity Head ($P_s$) | Pressure Differential Across Orifice Meter ($\Delta H$), In. $H_2O$ | Gas Sample Volume ($V_m$) ft$^3$ | Gas Sample Temperature at Dry Gas Meter | | Sample Box Temprtature °F | Temperature of Gas Leaving Condenser on Last Impinger °F |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Inlet ($T_{min.}$) °F | Outlet ($T_{mout}$) °F | | |
| | 10:42 | -0.23 | 530 | 0.11 | 1.72 | 2952.50 | | 95 | 315 | 80 |
| | 10:57 | | 535 | 0.11 | 1.72 | 66.00 | | 100 | 330 | 60 |
| | 11:12 | | 540 | 0.11 | 1.72 | 81.00 | | 110 | 330 | 58 |
| | 11:27 | | 540 | 0.11 | 1.72 | 94.00 | | 115 | 330 | 58 |
| | 11:45 | | 540 | 0.11 | 1.72 | 3010.00 | | 120 | 330 | 60 |
| | 11:50 | | | | | 3014.00 | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| TOTAL | 60 | | | | | 62.0 | | AVG. | AVG. | |
| AVERAGE | | | 540 | | | | | AVG. | | |

## PARTICULATE CALCULATION SHEET

Test Crew R.P.
Test No. 19-179 Date 3-3-77 Location 19
Box No. 1 Sample Probe Position
Test Description

Dry Gas Meter Vol. ($ft^3$)
Final 3014.50
Initial 2952.50
Total 62.0

| Impinger Water Vol (ml) | 1 | 2 | 3 | S. Gel | Total |
|---|---|---|---|---|---|
| Final | 182 | 126 | 5 | 611.0 | 924 |
| Initial | 100 | 100 | 0 | 596.0 | 796 |
| Δ Vol | 82 | 26 | 5 | 15 | 128.0 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Beaker No. | | 4 | 7 | 8 | 9 | 3 | Filter No. 22 | Blank No. 23 |
| Date Weighed | | 2-24-77 | 2-21-77 | 2-21-77 | 2-24-77 | 3-4-77 | 3-2-77 | 1-27-77 |
| Tare Wt. | 1 | 99.2643 | 104.0042 | 99.3352 | 100.1831 | 101.9826 | 0.7942 | 0.7884 |
| | 2 | 99.2644 | 104.0040 | 99.3352 | 100.1830 | 101.9826 | 0.7942 | 0.7885 |
| | 3 | | | | | | | |
| | 4 | | | | | | | |
| | 5 | | | | | | | |
| | 6 | | | | | | | |
| | Avg | 99.2644 | 104.0041 | 99.3352 | 100.1831 | 101.9826 | 0.7942 | 0.7884 |
| Bottle No. | | 1&2 | 3 | 4 | $H_2O$ Blank | Imp. $H_2O$ | | |
| Content | | Impinger (Water) | Probe (Acetone) | Probe (Water) | ~~Cyclone (Acetone)~~ | ~~Flask (Dry)~~ | | |
| Rinse (ml) | | 400 | 475 | 300 | 200 | 175 | | |
| Date Weighed or 250 Bake | | 3-4-77 | | | | | | → |
| Final Wt. 250 | 1 | 99.2803 | 104.0164 | 99.3425 | 100.1872 | 101.9912 | 0.8138 | 0.7883 |
| | 2 | 99.2803 | 104.0163 | 99.3425 | 100.1871 | 101.9912 | 0.8139 | 0.7882 |
| | 3 | | | | | | | |
| | 4 | | | | | | | |
| | 5 | | | | | | | |
| | 6 | | | | | | | |
| | Avg | 99.2803 | 104.0163 | 99.3425 | 100.1871 | 101.9913 | 0.8139 | 0.7883 |
| Residue wt Final 250-Tare | | 0.0159<br>0.0119 | 0.0062 | 0.0073<br>0.0033 | +0.004 | 0.0087<br>0.0047 | 0.0197 | - |
| Date Weighed or 650 Bake | | | | | | | | |
| Final Wt. 650 | 1 | | | | | | | |
| | 2 | | | | | | | |
| | 3 | | | | | | | |
| | 4 | | | | | | | |
| | 5 | | | | | | | |
| | 6 | | | | | | | |
| | Avg | | | | | | | |
| Residue Wt Final 650-Tare | | | | | | | | |

Comments:

Data Sheet 6002-3

## PARTICULATE EMISSION CALCULATIONS

Test No. 19-179 Date 3-3-77 Location 19 Engr. G.S.

Unit No. 1 Fuel #2 oil Sampling Train and Method 5

Pitot Factor, Fs 0.83 Barometric Pressure, $P_{bar}$ 30.34 in. Hg

Tot. Liquid Collected, $V_{1c}$ 128 ml Total Particulate, $M_n$ 19.9 solid 25.0 m gm total

Velocity Head, ΔP 0.11 iwg Stack Temp., Ts 1000 °R Stack Area, As 4.9 $ft^2$

Sample Volume, Vm 62 $ft^3$ Stack Press., Psg -0.23 iwg Excess $O_2$, $XO_2$% 3.5 %

Orifice Press. Diff., H 1.72 iwg Stack Gas Sp. Gravity, Gs ≈1 n.d.

Sample Time, θ 60 min Nozzle Dia., Dn 0.5 in. Meter Temp., $T_m$ ______ °R

| | | SOLID | TOTAL | |
|---|---|---|---|---|
| *1. Sample Gas Volume | $Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$ | | 63.09 | SCF |
| 2. Water Vapor | $Vw_{std} = 0.0474\ V_{1c}$ | | 6.07 | SCF |
| 3. Moisture Content | Bwo = Eq. 2/(Eq. 1 + Eq. 2) | | 0.088 | N.D. |
| 4. Concentration | a. $C = 0.0154\ Mn/Vm_{std}$ | 0.0048 | 0.0061 | grains/DSCF |
| | b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$ | $0.696 \times 10^{-6}$ | $8.74 \times 10^{-7}$ | lb/DSCF |
| | c. $C = \text{Eq. 4b} \times 16.018 \times 10^3$ | 0.0111 | 0.014 | grams/DSCM |
| 5. Abs. Stack Press. | $Ps = P_{bar} \times 13.6 + Psg$ | | 412.39 | in. w abs. |
| 6. Stack Gas Speed | $Vs = 174\ Fs \sqrt{\Delta P Ts} \sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$ | | 1505 | ft/min |
| 7. Stack Gas Flow Rate @ 70°F | a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$ | | 3960 | WSCF/min |
| | b. Qsd = Eq. 7a x (1. - Eq. 3) | | 3611 | DSCF/min |
| 8. Material Flow | Ms = Eq. 7b x Eq. 4b x 60 | | 0.189 | lb/hr |
| 9. $XO_2$ factor | $XO_2f = 2090/(20.9 - XO_2\%)$ | | 120 | N.D. |
| 10. Emission | a. E = Eq. 4b x Fe x Eq. 9 | 0.0077 | 0.0097 | lb/MMBtu |
| | b. E = Eq. 4c x Fm x Eq. 9 x 1000 | 3.31 | 4.16 | ng/joule |
| 11. % Isokinetic | $I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$ | | 92.3 | % |

| | Oil | Gas | Coal |
|---|---|---|---|
| Fe SC Feet/$10^4$ Btu | 92.2 | 87.4 | 98.2 |
| Fm SC Meters/$10^4$ joules | 0.002475 | 0.002346 | 0.002636 |

*Multiply $Vm_{std}$ by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

PLANT
LOCATION 19
OPERATOR R.P.
DATE 3-7-77
RUN NO. 19-190
SAMPLE BOX NO. 1
METER BOX NO. 4-11-1091
METER H
C FACTOR @ 0.83
Method 5

METHOD 5 CONTROL CONSOLE READINGS

SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE 35 °F
BAROMETRIC PRESSURE 30.07
ASSUMED MOISTURE, %
HEATER BOX SETTING
PROBE LENGTH, IN. 48
NOZZLE DIAMETER, IN. 0.5
PROBE HEATER SETTING

| Traverse Point Number | Sampling Time (e)Min. | Static Pressure $(P_s)$, In. ~~Hg.~~ $H_2O$ | Stack Temperature $(T_s)$ °F | Velocity Head $(P_s)$ | Pressure Differential Across Orifice Meter $(\Delta H)$, In. $H_2O$ | Gas Sample Volume $(V_m)$ $ft^3$ | Gas Sample Temperature at Dry Gas Meter | | Sample Box Temprtature °F | Temperature of Gas Leaving Condenser on Last Impinger °F |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Inlet $(T_{min.})$ °F | Outlet $(T_{mout})$ °F | | |
| | 10:15 | -0.23 | 510 | 0.1125 | 1.76 | 3054.76 | | 90 | 330 | 53 |
| | 10:30 | ↓ | 510 | 0.1125 | 1.76 | 3069.00 | | 93 | 325 | 60 |
| | 10:45 | ↓ | 515 | 0.1125 | 1.76 | 3084.00 | | 102 | 330 | 58 |
| | 11:00 | ↓ | 515 | 0.1125 | 1.76 | 3097.00 | | 110 | 335 | 58 |
| | 11:15 | ↓ | 515 | 0.1125 | 1.76 | 3112.00 | | 120 | 335 | 58 |
| | 11:20 | ↓ | 515 | 0.1125 | 1.76 | 3116.76 | | 120 | 335 | 58 |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| TOTAL | 65 | | | | | 62.0 | | AVG. 103 | AVG. | |
| AVERAGE | | | | | | | | AVG. | | |

## PARTICULATE CALCULATION SHEET

Test Crew R. P.
Test No. 19-190 Date 3-7-77 Location 19
Box No. 1 Sample Probe Position ℄ stack
Test Description

Dry Gas Meter Vol. (ft$^3$)
Final 3116.76
Initial 3054.76
Total 62.00

Impinger Water Vol (ml)

| | 1 | 2 | 3 | S. Gel | Total |
|---|---|---|---|---|---|
| Final | 240 | 144 | 4 | 689.0 | 1077.0 |
| Initial | 100 | 100 | 0 | 671.0 | 871.0 |
| Δ Vol | 140 | 44 | 4 | 18.0 | 206.0 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Beaker No. | | 1 | 3 | 5 | H₂O Blank<br>6 | Acetone Blank<br>7 | Filter No. 23 | Blank No. 25 |
| Date Weighed | | 3-4-77 | 3-7-77 | 3-4-77 | 3-4-77 | 3-7-77 | 1-27-77 | 1-27-77 |
| Tare Wt. | 1 | 100.0794 | 101.9823 | 98.9340 | 100.4843 | 104.0024 | 0.7884 | 0.8462 |
| | 2 | 100.0793 | 101.9822 | 98.9338 | 100.4841 | 104.0026 | 0.7885 | 0.8465 |
| | 3 | | | | | | | |
| | 4 | | | | | | | |
| | 5 | | | | | | | |
| | 6 | | | | | | | |
| | Avg | 100.0794 | 101.9823 | 98.9339 | 100.4842 | 104.0025 | 0.7885 | 0.8463 |
| Bottle No. | | 1 & 2 | 3 | 4 | | | | |
| Content | | Impinger (Water) | Probe (Acetone) | Probe (Water) | ~~Cyclone (Acetone)~~ | ~~Flask (Dry)~~ | | |
| Rinse (ml) | | 825 | 400 | 300 | 200 | 200 | | |
| Date Weighed or 250 Bake | | 3-8-77 | 3-8-77 | → | | | | |
| Final Wt. 250 | 1 | 100.0855 | 101.9857 | 98.9362 | 100.4828 | 104.0037 | 0.7934 | 0.8460 |
| | 2 | 100.0854 | 101.9856 | 98.9363 | 100.4828 | 104.0037 | 0.7933 | 0.8461 |
| | 3 | | | | | | | |
| | 4 | | | | | | | |
| | 5 | | | | | | | |
| | 6 | | | | | | | |
| | Avg | 100.0855 | 101.9857 | 98.9363 | 100.4828 | 104.0037 | 0.7934 | 0.8461 |
| Residue wt Final 250-Tare | | 0.0061 | 0.0034 | 0.0024 | 0 | 0.0012 | 0.0049 | 0 |
| Date Weighed or 650 Bake | | | | | | | | |
| Final Wt. 650 | 1 | | | | | | | |
| | 2 | | | | | | | |
| | 3 | | | | | | | |
| | 4 | | | | | | | |
| | 5 | | | | | | | |
| | 6 | | | | | | | |
| | Avg | | | | | | | |
| Residue Wt Final 650-Tare | | | | | | | | |

Comments:

Data Sheet 6002-3

## PARTICULATE EMISSION CALCULATIONS

Test No. 19-190 Date 3-7-77 Location 19 Engr. G.S.

Unit No. 1 Fuel Nat Gas Sampling Train and Method Method 5

Pitot Factor, Fs 0.83 Barometric Pressure, $P_{bar}$ 30.07 in. Hg

Tot. Liquid Collected, $V_{1c}$ 206 ml Total Particulate, $M_n$ 14.4 total 8.3 m gm solid

Velocity Head, $\Delta P$ 0.1125 iwg Stack Temp., Ts 975 °R Stack Area, As 4.9 $ft^2$

Sample Volume, Vm 62 $ft^3$ Stack Press., Psg -0.23 iwg Excess $O_2$, $XO_2$% 3.2 %

Orifice Press. Diff., H 1.76 iwg Stack Gas Sp. Gravity, Gs ≈1 n.d.

Sample Time, θ 65 min Nozzle Dia., Dn 0.5 in. Meter Temp., $T_m$ ____ °R

| | | | TOTAL | SOLID | |
|---|---|---|---|---|---|
| *1. Sample Gas Volume | | $Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$ | | 62.54 | SCF |
| 2. Water Vapor | | $Vw_{std} = 0.0474\ V_{1c}$ | | 9.76 | SCF |
| 3. Moisture Content | | Bwo = Eq. 2/(Eq. 1 + Eq. 2) | | 0.135 | N.D. |
| 4. Concentration | a. | $C = 0.0154\ Mn/Vm_{std}$ | 0.00355 | 0.00204 | grains/DSCF |
| | b. | $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$ | $0.508 \times 10^{-6}$ | $0.2926 \times 10^{-6}$ | lb/DSCF |
| | c. | $C = \text{Eq. 4b} \times 16.018 \times 10^3$ | 0.00813 | $4.69 \times 10^{-3}$ | grams/DSCM |
| 5. Abs. Stack Press. | | $Ps = P_{bar} \times 13.6 + Psg$ | | 402.04 | in. w abs. |
| 6. Stack Gas Speed | | $Vs = 174\ Fs\ \sqrt{\Delta PTs}\sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$ | | 1522 | ft/min |
| 7. Stack Gas Flow Rate @ 70°F | a. | $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$ | | 4004.6 | WSCF/min |
| | b. | Qsd = Eq. 7a x (1. - Eq. 3) | | 3464 | DSCF/min |
| 8. Material Flow | | Ms = Eq. 7b x Eq. 4b x 60 | | $6.08 \times 10^{-2}$ | lb/hr |
| 9. $XO_2$ factor | | $XO_2f = 2090/(20.9 - XO_2\%)$ | | 118.08 | N.D. |
| 10. Emission | a. | E = Eq. 4b x Fe x Eq. 9 | .00524 | $3.02 \times 10^{-3}$ | lb/MMBtu |
| | b. | E = Eq. 4c x Fm x Eq. 9 x 1000 | 2.253 | 1.2992 | ng/joule |
| 11. % Isokinetic | | $I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$ | | 99.79 | % |

| | Oil | Gas | Coal |
|---|---|---|---|
| Fe SC Feet/$10^4$ Btu | 92.2 | 87.4 | 98.2 |
| Fm SC Meters/$10^4$ joules | 0.002475 | 0.002346 | 0.002636 |

*Multiply $Vm_{std}$ by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

PLANT
LOCATION 19
OPERATOR R.P.
DATE 3-8-77
RUN NO. 19-193
SAMPLE BOX NO. 1
METER BOX NO. 4-11-1091
METER H
C FACTOR @ 0.83
Method 5

METHOD 5 CONTROL CONSOLE READINGS

SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE 40
BAROMETRIC PRESSURE 30.28
ASSUMED MOISTURE, %
HEATER BOX SETTING
PROBE LENGTH, IN. 48
NOZZLE DIAMETER, IN. 0.5
PROBE HEATER SETTING

| Traverse Point Number | Sampling Time (e) Min. | Static Pressure ($P_s$), In. ~~Hg.~~ $H_2O$ | Stack Temperature ($T_s$) °F | Velocity Head ($P_s$) | Pressure Differential Across Orifice Meter ($\Delta H$), In. $H_2O$ | Gas Sample Volume ($V_m$) ft$^3$ | Gas Sample Temperature at Dry Gas Meter | | Sample Box Temprtature °F | Temperature of Gas Leaving Condenser on Last Impinger °F |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Inlet ($T_{min.}$) °F | Outlet ($T_{mout}$) °F | | |
| | 10:35 | -0.225 | 495 | 0.115 | 1.80 | 3117.20 | | 85 | 320 | 52 |
| | 10:50 | | 500 | 0.115 | 1.80 | 3132.00 | | 90 | 325 | 52 |
| | 11:05 | | 500 | 0.115 | 1.80 | 3146.20 | | 98 | 330 | 55 |
| | 11:20 | | 500 | 0.115 | 1.80 | 3162.20 | | 110 | 340 | 57 |
| | 11:35 | | 500 | 0.115 | 1.80 | 3175.00 | | 114 | 340 | 58 |
| | 11:50 | | 500 | 0.115 | 1.80 | 3189.00 | | 120 | 345 | 60 |
| | 12:05 | | 505 | 0.115 | 1.80 | 3203.00 | | 125 | 350 | 60 |
| | 12:20 | | 505 | 0.115 | 1.80 | 3217.20 | | 130 | 350 | 60 |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| TOTAL | 105 | | | | | 100 | | AVG. | AVG. | |
| AVERAGE | | | | | | | | AVG. | | |

## PARTICULATE CALCULATION SHEET

Test Crew R.P.
Test No. 19-193 Date 3-8-77 Location 19
Box No. 1 Sample Probe Position ℄ stack
Test Description

---

Dry Gas Meter Vol. (ft$^3$)
Final 3217.2
Initial 3117.2
Total 100.0

Impinger Water Vol (ml)

| | 1 | 2 | 3 | S. Gel | Total |
|---|---|---|---|---|---|
| Final | 358 | 235 | 10 | 677.5 | 1280.5 |
| Initial | 100 | 100 | 0 | 650.5 | 850.5 |
| Δ Vol | 258 | 135 | 10 | 27.0 | 430.0 |

| | | | | | | Filter No. 24 | Blank No. 25 |
|---|---|---|---|---|---|---|---|
| Beaker No. | | 8 | 9 | 10 | | | |
| Date Weighed | | 3-7-77 | 3-7-77 | 3-4-77 | | 1-27-77 | 3-8-77 |
| Tare Wt. | 1 | 99.3352 | 100.1828 | 100.9384 | | 0.8006 | 0.8460 |
| | 2 | 99.3351 | 100.1828 | 100.9384 | | 0.8005 | 0.8461 |
| | 3 | | | | | | |
| | 4 | | | | | | |
| | 5 | | | | | | |
| | 6 | | | | | | |
| | Avg | 99.3352 | 100.1828 | 100.9384 | | 0.8006 | 0.8461 |
| Bottle No. | | 1 & 2 | 3 | 4 | | | |
| Content | | Impinger (Water) | Probe (Acetone) | Probe (Water) | Cyclone (Acetone) | Flask (Dry) | | |
| Rinse (ml) | | 1025 | 450 | 325 | | | | |
| Date Weighed or 250 Bake | | 3-10-77 | 3-9-77 | 3-9-77 | | | 3-9-77 | 3-9-77 |
| Final Wt. 250 | 1 | 99.3510 | 100.1924 | 100.9408 | | | 0.8111 | 0.8454 |
| | 2 | 99.3510 | 100.1920 | 100.9403 | | | 0.8111 | 0.8457 |
| | 3 | | 100.1918 | 100.9405 | | | 0.8110 | 0.8454 |
| | 4 | | | | | | | |
| | 5 | | | | | | | |
| | 6 | | | | | | | |
| | Avg | 99.3510 | 100.1920 | 100.9405 | | | 0.8111 | 0.8456 |
| Residue wt Final 250-Tare | | 0.0158 | 0.0092 | 0.0021 | | | 0.0105 | 0 |
| Date Weighed or 650 Bake | | | | | | | | |
| Final Wt. 650 | 1 | | | | | | | |
| | 2 | | | | | | | |
| | 3 | | | | | | | |
| | 4 | | | | | | | |
| | 5 | | | | | | | |
| | 6 | | | | | | | |
| | Avg | | | | | | | |
| Residue Wt Final 650-Tare | | | | | | | | |

Comments:

Data Sheet 6002-3

## PARTICULATE EMISSION CALCULATIONS

Test No. 19-193 Date 3-8-77 Location 19 Engr. G. S.

Unit No. 1 Fuel Nat. Gas Sampling Train and Method Meth 5

Pitot Factor, Fs 0.83 Barometric Pressure, $P_{bar}$ 30.28 in. Hg

Tot. Liquid Collected, $V_{1c}$ 430 ml Total Particulate, $M_n$ 37.6 Total 21.8 Solid m gm

Velocity Head, ΔP 0.115 iwg Stack Temp., Ts 960 °R Stack Area, As 4.9 $ft^2$

Sample Volume, Vm 100 $ft^3$ Stack Press., Psg -0.225 iwg Excess $O_2$, $XO_2$% 3.2 %

Orifice Press. Diff., H 1.8 iwg Stack Gas Sp. Gravity, Gs ≈1 n.d.

Sample Time, θ 105 min Nozzle Dia., Dn 0.5 in. Meter Temp., $T_m$ ______ °R

| | | | TOTAL | SOLID | |
|---|---|---|---|---|---|
| *1. Sample Gas Volume | | $Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$ | | 101.577 | SCF |
| 2. Water Vapor | | $Vw_{std} = 0.0474\ V_{1c}$ | | 20.382 | SCF |
| 3. Moisture Content | | Bwo = Eq. 2/(Eq. 1 + Eq. 2) | | 0.167 | N.D. |
| 4. Concentration | a. | $C = 0.0154\ Mn/Vm_{std}$ | 0.00578 | 0.00335 | grains/DSCF |
| | b. | $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$ | $0.8275 \times 10^{-6}$ | $0.4807 \times 10^{-6}$ | lb/DSCF |
| | c. | $C = \text{Eq. 4b} \times 16.018 \times 10^3$ | 0.0133 | $7.7 \times 10^{-3}$ | grams/DSCM |
| 5. Abs. Stack Press. | | $Ps = P_{bar} \times 13.6 + Psg$ | | 404.995 | in. w abs. |
| 6. Stack Gas Speed | | $Vs = 174\ Fs \sqrt{\Delta P Ts} \sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$ | | 1521.17 | ft/min |
| 7. Stack Gas Flow Rate @ 70°F | a. | $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$ | | 4094.8 | WSCF/min |
| | b. | Qsd = Eq. 7a x (1. - Eq. 3) | | 3410.968 | DSCF/min |
| 8. Material Flow | | Ms = Eq. 7b x Eq. 4b x 60 | | $9.838 \times 10^{-2}$ | lb/hr |
| 9. $XO_2$ factor | | $XO_2f = 2090/(20.9 - XO_2\%)$ | | 118.08 | N.D. |
| 10. Emission | a. | E = Eq. 4b x Fe x Eq. 9 | $8.555 \times 10^{-3}$ | $4.961 \times 10^{-3}$ | lb/MMBtu |
| | b. | E = Eq. 4c x Fm x Eq. 9 x 1000 | 3.679 | 2.133 | ng/joule |
| 11. % Isokinetic | | $I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$ | | 101.91 | % |

| | Oil | Gas | Coal |
|---|---|---|---|
| Fe SC Feet/$10^4$ Btu | 92.2 | 87.4 | 98.2 |
| Fm SC Meters/$10^4$ joules | 0.002475 | 0.002346 | 0.002636 |

*Multiply $Vm_{std}$ by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

## PLUME OPACITY OBSERVATION RECORD

19-76

Test Run No. ~~2-28~~

LOCATION NO. 19

OBSERVER M. HAGERTY

OWNER

BOILER NO. 1 CAPACITY ~ 18 klb/hr

DATE 1-19-77

FUEL TYPE #2 BURNER TYPE

POINT OF EMISSION STACK

POINT OF OBSERVATION ~ 200' FROM STACK AT 90° TO WIND DIRECTION SUN ON RT AT 90° TO OBSERVATION POINT.

| TEST | | | Test Load k#/hr | Opacity % | WIND | | Sky Cond. | Sun Position | Comments |
|---|---|---|---|---|---|---|---|---|---|
| No. | Time am/pm | Type | | | Speed mph | Direct. | | | |
| 1 | 1400 | LO $O_2$<br>#2 OIL | 14 | 0 | 0-5 | S.E. | CLOUDY<br>HAZY | 90°<br>TO RT. | |
| 2 | 1405 | | | 0 | | | | | |
| 3 | 1410 | | | 0 | | | | | |
| 4 | 1415 | | | 0 | | | | | |
| 5 | 1420 | | | 0 | | | | | THERMAL PLUME IS VISIBLE AGAINST CLOUDS |
| 6 | 1425 | | | 0 | | | | | |
| 7 | 1430 | | | 0 | | | | | |
| 8 | 1435 | | | 0 | | | | | |
| 9 | 1448 | | | 5 | | | | | |
| 10 | 1509 | | | 0-5 | | | | | |
| 11 | 1510 | | | 5 | | | | | |
| 12 | 1511 | | | 0-5 | | | | | |
| 13 | 1512 | | | 0 | | | | | |
| 14 | 1513 | | | 0-5 | | | | | |
| 15 | 1514 | | | 0 | | | | | |
| 16 | 1515 | | | 0 | | | | | |

60-25

## PLUME OPACITY OBSERVATION RECORD

Test Run No. 19-74, 75

LOCATION NO. 19

OBSERVER M. HAGERTY

OWNER

BOILER NO. 1

CAPACITY ~ 18 klb/hr

DATE 1-19-77

FUEL TYPE #2 OIL

BURNER TYPE

POINT OF EMISSION STACK

POINT OF OBSERVATION ~ 200' FROM STACK AT 90° TO WIND DIRECTION, SUN ON RT. AT 90° TO OBSERVATION POINT.

| TEST | | | Test Load k#/hr | Opacity % | WIND | | Sky Cond. | Sun Position | Comments |
|---|---|---|---|---|---|---|---|---|---|
| No. | Time am/pm | Type | | | Speed mph | Direct. | | | |
| 1 | 1400 | LO $O_2$<br>#2 OIL | 14 | 0 | 0-5 | S.E | CLOUDY<br>HAZY | 90°<br>TO RT. | |
| 2 | 1405 | | | 0 | | | | | |
| 3 | 1410 | | | 0 | | | | | |
| 4 | 1415 | | | 0 | | | | | THERMAL PLUME IS VISIBLE AGAINST CLOUDS |
| 5 | 1420 | | | 0 | | | | | |
| 6 | 1425 | | | 0 | | | | | |
| 7 | 1430 | | | 0 | | | | | |
| 8 | 1435 | | | ·0 | | | | | |
| 9 | 1448 | | | 5 | | | | | |
| 10 | 1509 | | | 0-5 | | | | | |
| 11 | 1510 | | | 5 | | | | | |
| 12 | 1511 | | | 0-5 | | | | | |
| 13 | 1512 | | | 0 | | | | | |
| 14 | 1513 | | | 0-5 | | | | | |
| 15 | 1514 | | | 0 | | | | | |
| 16 | 1515 | | | 0 | | | | | |

# PLUME OPACITY OBSERVATION RECORD

Test Run No. 19- 83, 84

LOCATION NO. 19
OBSERVER M. HAGERTY

OWNER

BOILER NO. 1 CAPACITY klb/hr

DATE 1-20-77

FUEL TYPE #2 OIL BURNER TYPE

POINT OF EMISSION STACK

POINT OF OBSERVATION ~ 300' FROM STACT @ 90° TO WIND DIRECTION,
SUN @ 90° TO RT. FROM OBSERVATION POINT

| TEST | | | Test Load k#/hr | Opacity % | WIND | | Sky Cond. | Sun Position | Comments |
|---|---|---|---|---|---|---|---|---|---|
| No. | Time am/pm | Type | | | Speed mph | Direct. | | | |
| 1 | 1620 | 20 $O_2$<br>90% FGR | 14 | 0 | 0-5 | S.E | HAZY | 90°<br>TO RT. | ATMOSPHERIC<br>HAZE ~ 5% |
| 2 | 1625 | | | 0 | | | | | |
| 3 | 1630 | | | 0 | | | | | |
| 4 | 1631 | | | 0 | | | | | |
| 5 | 1632 | | | 0 | | | | | |
| 6 | 1633 | | | 0 | | | | | |
| 7 | 1634 | | | 0 | | | | | |
| 8 | 1635 | | | 0 | | | | | |
| 9 | 1640 | | | 0 | | | | | |
| 10 | 1645 | | | 0 | | | | | |
| 11 | 1650 | | | 0 | | | | | |
| 12 | 1651 | | | 0 | | | | | |
| 13 | 1652 | | | 0 | | | | | |
| 14 | 1653 | | | 0 | | | | | |
| 15 | 1654 | | | 0 | | | | | |
| 16 | 1655 | | | 0 | | | | | |

60-25

# PLUME OPACITY OBSERVATION RECORD

Test Run No. 19-117

LOCATION NO. 19

OBSERVER SOTTER

OWNER

BOILER NO. 1 CAPACITY 17,500 klb/hr

DATE 1-26-77

FUEL TYPE #2 BURNER TYPE FABER

POINT OF EMISSION STACK

POINT OF OBSERVATION ACROSS STREET, 45° TO WIND DIRECTION, SUN 20° TO RT FROM OBSERVATION POINT. ~2 STACK HEIGHTS FROM STACK

| TEST | | | Test Load k#/hr | Opacity % | WIND | | Sky Cond. | Sun Position | Comments |
|---|---|---|---|---|---|---|---|---|---|
| No. | Time am/pm | Type | | | Speed mph | Direct. | | | |
| 1 | 1155 | HI 0<br>MIN $O_2$ | | 20 | | | PARTLY CLOUDY | BEHIND OBSERVER + CLOUDS | OPACITY FLUCTUATING |
| 2 | | | | 20 | | | | | |
| 3 | | | | 0 | | | | | |
| 4 | | | | 5 | | | | | |
| 5 | | | | 10 | | | | | |
| 6 | | | | 15 | | | | | |
| 7 | | | | 5 | | | | | |
| 8 | | | | 10 | | | | | |
| 9 | | | | 5 | | | | | |
| 10 | 1158 | | | 25 | | | | | |
| 11 | | | | 15 | | | | | |
| 12 | | | | 30 | | | | | |
| 13 | | | | 15 | | | | | |
| 14 | | | | 10 | | | | | |
| 15 | | | | 10 | | | | | |
| 16 | | | | 15 | | | | | |

60-25

## PLUME OPACITY OBSERVATION RECORD

Test Run No. 19-117 CONT'D

LOCATION NO. 19 OBSERVER

OWNER BOILER NO. CAPACITY klb/hr

DATE 1/26/77 FUEL TYPE BURNER TYPE

POINT OF EMISSION

POINT OF OBSERVATION

| TEST | | | Test Load k#/hr | Opacity % | WIND | | Sky Cond. | Sun Position | Comments |
|---|---|---|---|---|---|---|---|---|---|
| No. | Time am/pm | Type | | | Speed mph | Direct. | | | |
| 17 | | | | 25 | | | | | |
| 18 | | | | 5 | | | | | |
| 19 | | | | 5 | | | | | |
| 20 | | | | 30 | | | | | |
| 21 | | | | 40 | | | | | |
| 22 | | | | 0 | | | | | |
| 23 | | | | 5 | | | | | |
| 24 | | | | 10 | | | | | |
| 25 | | | | 5 | | | | | |
| | | AVE | | 13 | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

60-25

19-132

## PLUME OPACITY OBSERVATION RECORD

Test Run No. 12 P/S/I

LOCATION NO. 19 OBSERVER MBH

OWNER ______ BOILER NO. ______ CAPACITY ______ klb/hr

DATE 2-17-77 FUEL TYPE ______ BURNER TYPE ______

POINT OF EMISSION ______

POINT OF OBSERVATION ≈ 150 ft North-East of building

| TEST | | | Test Load k#/hr | Opacity % | WIND | | Sky Cond. | Sun Posi-tion | Comments |
|---|---|---|---|---|---|---|---|---|---|
| No. | Time [✓ am]/pm | Type | | | Speed mph | Direct. | | | |
| 1 | start 11:58 | | | 5 | 10-15 | NW | clear | | |
| 2 | 11:58:15 | | | | ↓ | | ↓ | | |
| 3 | :30 | | | | | | | | |
| 4 | :45 | | | | | | | | |
| 5 | 11:59 | | | | | | | | |
| 6 | :15 | | | | | | | | |
| 7 | :30 | | | | | | | | |
| 8 | :45 | | | | | | | | |
| 9 | 12:00 | | | | | | | | |
| 10 | :15 | | | | | | | | |
| 11 | :30 | | | | | | | | |
| 12 | :45 | | | | | | | | |
| 13 | 12:01 | | | | | | | | |
| 14 | :15 | | | | | | | | |
| 15 | :30 | | | | | | | | |
| 16 | :45 | | | | | | | | |

60-25

## PLUME OPACITY OBSERVATION RECORD

Test Run No. 19-140

LOCATION NO. 19

OBSERVER M. B. H.

OWNER

BOILER NO.

CAPACITY klb/hr

DATE 2-21-77

FUEL TYPE

BURNER TYPE

POINT OF EMISSION stack

POINT OF OBSERVATION ≈100 ft. North East of stack

| TEST |  |  | Test Load k#/hr | Opacity % | WIND |  | Sky Cond. | Sun Posi-tion | Comments |
|---|---|---|---|---|---|---|---|---|---|
| No. | Time am/pm | Type |  |  | Speed mph | Direct. |  |  |  |
| 1 | 14:45 |  |  | 25 | 15-20 |  | clear sky |  |  |
| 2 | :15 |  |  | 25 | ↓ |  | ↓ |  |  |
| 3 | :30 |  |  | 20 |  |  |  |  |  |
| 4 | :45 |  |  | 25 |  |  |  |  |  |
| 5 | 14:46 |  |  | 20 |  |  |  |  |  |
| 6 | :15 |  |  | 25 |  |  |  |  |  |
| 7 | :30 |  |  | 30 |  |  |  |  |  |
| 8 | :45 |  |  | 25 |  |  |  |  |  |
| 9 | 14:47 |  |  | 20 |  |  |  |  |  |
| 10 | :15 |  |  | 20 |  |  |  |  |  |
| 11 | :30 |  |  | 15 |  |  |  |  |  |
| 12 | :45 |  |  | 25 |  |  |  |  |  |
| 13 | 14:48 |  |  | 20 |  |  |  |  |  |
| 14 | :15 |  |  | 20 |  |  |  |  |  |
| 15 | :30 |  |  | 25 |  |  |  |  |  |
| 16 | :45 |  |  | 30 |  |  |  |  |  |

## PLUME OPACITY OBSERVATION RECORD

Test Run No. 19-159

LOCATION NO. 19

OBSERVER MBH

OWNER

BOILER NO. 1

CAPACITY klb/hr

DATE 2-23-77

FUEL TYPE #6

BURNER TYPE

POINT OF EMISSION Stack

POINT OF OBSERVATION 100 feet NE of stack

| TEST | | | Test Load k#/hr | Opacity % | WIND | | Sky Cond. | Sun Position | Comments |
|---|---|---|---|---|---|---|---|---|---|
| No. | Time am/pm | Type | | | Speed mph | Direct. | | | |
| 1 | 11:40 | | | 0 | 5-10 | W. | clear | | |
| 2 | :15 | | | 0 | | | | | |
| 3 | :30 | | | 0 | | | | | |
| 4 | :45 | | | 0 | | | | | |
| 5 | 11:41 | | | 0 | | | | | |
| 6 | :15 | | | 0 | | | | | |
| 7 | :30 | | | 0 | | | | | |
| 8 | :45 | | | 0 | | | | | |
| 9 | 11:42 | | | 0 | | | | | |
| 10 | :15 | | | 0 | | | | | |
| 11 | :30 | | | 0 | | | | | |
| 12 | :45 | | | 0 | | | | | |
| 13 | 11:43 | | | 0 | | | | | |
| 14 | :15 | | | 0 | | | | | |
| 15 | :30 | | | 0 | | | | | |
| 16 | :45 | | | 0 | ↓ | ↓ | ↓ | | |

60-25

## PLUME OPACITY OBSERVATION RECORD

Test Run No. 19-165

LOCATION NO. 19 OBSERVER MBH

OWNER ______ BOILER NO. ______ CAPACITY ______ klb/hr

DATE 3-1-77 FUEL TYPE ______ BURNER TYPE ______

POINT OF EMISSION stack

POINT OF OBSERVATION ≈ 100 ft NE of stack

| TEST | | | Test Load k#/hr | Opacity % | WIND | | Sky Cond. | Sun Position | Comments |
|---|---|---|---|---|---|---|---|---|---|
| No. | Time am/pm | Type | | | Speed mph | Direct. | | | |
| 1 | 9:23 | | | 0 | ≈ 10 | S.E | clear | | |
| 2 | :15 | | | 0 | ↓ | ↓ | ↓ | | |
| 3 | :30 | | | 0 | | | | | |
| 4 | :45 | | | 0 | | | | | |
| 5 | 9:24 | | | 0 | | | | | |
| 6 | :15 | | | 0 | | | | | |
| 7 | :30 | | | 0 | | | | | |
| 8 | :45 | | | 0 | | | | | |
| 9 | 9:25 | | | 0 | | | | | |
| 10 | :15 | | | 0 | | | | | |
| 11 | :30 | | | 0 | | | | | |
| 12 | :45 | | | 0 | | | | | |
| 13 | 9:26 | | | 0 | | | | | |
| 14 | :15 | | | 0 | | | | | |
| 15 | :30 | | | 0 | | | | | |
| 16 | :45 | | | 0 | | | | | |

## PLUME OPACITY OBSERVATION RECORD

Test Run No. 19-170

LOCATION NO. 19 OBSERVER MBH

OWNER ______ BOILER NO. 1 CAPACITY ______ klb/hr

DATE 3-1-77 FUEL TYPE #6 oil BURNER TYPE ______

POINT OF EMISSION Stack

POINT OF OBSERVATION 100 ft. NE of stack

| TEST | | | Test Load | Opacity | WIND | | Sky Cond. | Sun Posi-tion | Comments |
|---|---|---|---|---|---|---|---|---|---|
| No. | Time am/pm | Type | k#/hr | % | Speed mph | Direct. | | | |
| 1 | 14:10 | | | 0 | 15-20 | E. | clear | | |
| 2 | :15 | | | 0 | ↓ | ↓ | ↓ | | |
| 3 | :30 | | | 0 | | | | | |
| 4 | :45 | | | 0 | | | | | |
| 5 | 14:11 | | | 0 | | | | | |
| 6 | :15 | | | 0 | | | | | |
| 7 | :30 | | | 0 | | | | | |
| 8 | :45 | | | 0 | | | | | |
| 9 | 14:12 | | | 0 | | | | | |
| 10 | :15 | | | 0 | | | | | |
| 11 | :30 | | | 0 | | | | | |
| 12 | :45 | | | 0 | | | | | |
| 13 | 14:13 | | | 0 | | | | | |
| 14 | :15 | | | 0 | | | | | |
| 15 | :30 | | | 0 | | | | | |
| 16 | :45 | | | 0 | | | | | |

## PLUME OPACITY OBSERVATION RECORD

Test Run No. 19-179

LOCATION NO. 19 OBSERVER M.B.H.

OWNER ______ BOILER NO. 1 CAPACITY ______ klb/hr

DATE 3-3-77 FUEL TYPE #2 BURNER TYPE ______

POINT OF EMISSION Stack

POINT OF OBSERVATION ~100 ft. NE of stack

| TEST | | | Test Load k#/hr | Opacity % | WIND | | Sky Cond. | Sun Position | Comments |
|---|---|---|---|---|---|---|---|---|---|
| No. | Time am/pm | Type | | | Speed mph | Direct. | | | |
| 1 | 13:43 | | | 0 | 0-5 | NW | Hazy clouds | | |
| 2 | :15 | | | 0 | ↓ | ↓ | ↓ | | |
| 3 | :30 | | | 0 | ↓ | ↓ | ↓ | | |
| 4 | :45 | | | 0 | ↓ | ↓ | ↓ | | |
| 5 | 13:44 | | | 0 | ↓ | ↓ | ↓ | | |
| 6 | :15 | | | 0 | ↓ | ↓ | ↓ | | |
| 7 | :30 | | | 0 | ↓ | ↓ | ↓ | | |
| 8 | :45 | | | 0 | ↓ | ↓ | ↓ | | |
| 9 | 13:45 | | | 0 | ↓ | ↓ | ↓ | | |
| 10 | :15 | | | 0 | ↓ | ↓ | ↓ | | |
| 11 | :30 | | | 0 | ↓ | ↓ | ↓ | | |
| 12 | :45 | | | 0 | ↓ | ↓ | ↓ | | |
| 13 | 13:46 | | | 0 | ↓ | ↓ | ↓ | | |
| 14 | :15 | | | 0 | ↓ | ↓ | ↓ | | |
| 15 | :30 | | | 0 | ↓ | ↓ | ↓ | | |
| 16 | :45 | | | 0 | ↓ | ↓ | ↓ | | |

60-25

## PLUME OPACITY OBSERVATION RECORD

Test Run No. 19-190

LOCATION NO. 19 OBSERVER MBH

OWNER BOILER NO. 1 CAPACITY klb/hr

DATE 3-7-77 FUEL TYPE N.G. BURNER TYPE

POINT OF EMISSION stack

POINT OF OBSERVATION ≈100 ft N.E. of stack

| TEST | | | Test Load k#/hr | Opacity % | WIND | | Sky Cond. | Sun Posi-tion | Comments |
|---|---|---|---|---|---|---|---|---|---|
| No. | Time am/pm | Type | | | Speed mph | Direct. | | | |
| 1 | 11:24 | | | 0 | 5-10 | E | cloudy | | |
| 2 | :15 | | | 0 | ↓ | ↓ | ↓ | | |
| 3 | :30 | | | 0 | ↓ | ↓ | ↓ | | |
| 4 | :45 | | | 0 | ↓ | ↓ | ↓ | | |
| 5 | 11:25 | | | 0 | ↓ | ↓ | ↓ | | |
| 6 | :15 | | | 0 | ↓ | ↓ | ↓ | | |
| 7 | :30 | | | 0 | ↓ | ↓ | ↓ | | |
| 8 | :45 | | | 0 | ↓ | ↓ | ↓ | | |
| 9 | 11:26 | | | 0 | ↓ | ↓ | ↓ | | |
| 10 | :15 | | | 0 | ↓ | ↓ | ↓ | | |
| 11 | :30 | | | 0 | ↓ | ↓ | ↓ | | |
| 12 | :45 | | | 0 | ↓ | ↓ | ↓ | | |
| 13 | 11:27 | | | 0 | ↓ | ↓ | ↓ | | |
| 14 | :15 | | | 0 | ↓ | ↓ | ↓ | | |
| 15 | :30 | | | 0 | ↓ | ↓ | ↓ | | |
| 16 | :45 | | | 0 | ↓ | ↓ | ↓ | | |

60-25

## PLUME OPACITY OBSERVATION RECORD

Test Run No. 19-1 SASS

LOCATION NO. 19 OBSERVER MBH

OWNER ______ BOILER NO. ______ CAPACITY ______ klb/hr

DATE 3-10-77 FUEL TYPE #6 OIL BURNER TYPE ______

POINT OF EMISSION ______

POINT OF OBSERVATION ~100 feet north of stack

| TEST | | | Test Load k#/hr | Opacity % | WIND | | Sky Cond. | Sun Position | Comments |
|---|---|---|---|---|---|---|---|---|---|
| No. | Time am/pm | Type | | | Speed mph | Direct. | | | |
| 1 | 1115 | SASS | | 0 | 0-5 | S.W. | CLEAR | | |
| 2 | 1130 | | | 0 | | | | | |
| 3 | 1145 | | | 0 | | | | | |
| 4 | 1200 | | | 0 | | | | | |
| 5 | 1215 | | | 0 | | | | | |
| 6 | 1230 | | | 0 | | | | | |
| 7 | 1245 | | | 0 | | | | | |
| 8 | 1300 | | | 0 | | | | | |
| 9 | 1315 | | | 0 | | | | | |
| 10 | 1330 | | | 0 | | | | | |
| 11 | 1345 | | | 0 | | | | | |
| 12 | 1400 | | | 0 | | | | | |
| 13 | 1415 | | | 0 | | | | | |
| 14 | 1430 | | | 0 | | | | | |
| 15 | 1445 | | | 0 | | | | | |
| 16 | 1500 | ↓ | | 0 | ↓ | ↓ | ↓ | | |

60-25

## PLUME OPACITY OBSERVATION RECORD

Test Run No. 19-1SASS

LOCATION NO. 19 OBSERVER MBH

OWNER BOILER NO. CAPACITY klb/hr

DATE 3-10-77 FUEL TYPE #6 OIL BURNER TYPE

POINT OF EMISSION

POINT OF OBSERVATION ~ 100 feet north of stack

| TEST | | | Test Load k#/hr | Opacity % | WIND | | Sky Cond. | Sun Position | Comments |
|---|---|---|---|---|---|---|---|---|---|
| No. | Time am/pm | Type | | | Speed mph | Direct. | | | |
| 17 | 1515 | SASS | | 0 | 0-5 | SW | CLEAR | | |
| 18 | 1530 | ↓ | | 0 | ↓ | ↓ | ↓ | | |
| 19 | 1545 | ↓ | | 0 | ↓ | ↓ | ↓ | | |
| 20 | 1620 | ↓ | | 0 | ↓ | ↓ | ↓ | | |
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## PLUME OPACITY OBSERVATION RECORD

Test Run No. 19-2 SASS

LOCATION NO. 19

OBSERVERS MBH / HJB

OWNER

BOILER NO.

CAPACITY klb/hr

DATE 3-17-77

FUEL TYPE

BURNER TYPE

POINT OF EMISSION

POINT OF OBSERVATION ~100' EAST OF TRAILER

| TEST | | | Test | Opacity | WIND | | Sky | Sun | |
|---|---|---|---|---|---|---|---|---|---|
| No. | Time am/pm | Type | Load k#/hr | % | Speed mph | Direct. | Cond. | Position | Comments |
| 1 | 1000 | | | 5 | 10-15 | E | CLEAR | | |
| 2 | 1100 | | | 5 | ↓ | ↓ | ↓ | | |
| 3 | 1200 | | | 0 | ↓ | ↓ | ↓ | | |
| 4 | 1300 | | | 0 | ↓ | ↓ | ↓ | | |
| 5 | 1400 | | | 5 | ↓ | ↓ | ↓ | | |
| 6 | 1500 | | | 0 | ↓ | ↓ | ↓ | | |
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60-25

## PLUME OPACITY OBSERVATION RECORD

Test Run No. 19-3 SASS

LOCATION NO. G

OBSERVER JABH/HJB

OWNER

BOILER NO.

CAPACITY klb/hr

DATE 3-21-77

FUEL TYPE

BURNER TYPE

POINT OF EMISSION

POINT OF OBSERVATION ~100 feet East

| TEST | | | Test Load k#/hr | Opacity % | WIND | | Sky Cond. | Sun Position | Comments |
|---|---|---|---|---|---|---|---|---|---|
| No. | Time am/pm | Type | | | Speed mph | Direct. | | | |
| 1 | 1030 | SASS | | 5 | 10-15 | W | CLEAR | | |
| 2 | 1130 | ↓ | | 10 | ↓ | ↓ | ↓ | | |
| 3 | 1230 | ↓ | | 5 | ↓ | ↓ | ↓ | | |
| 4 | 1330 | ↓ | | 10 | ↓ | ↓ | ↓ | | |
| 5 | 1430 | ↓ | | 10 | ↓ | ↓ | ↓ | | |
| 6 | 1530 | ↓ | | 5 | ↓ | ↓ | ↓ | | |
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60-25

## PLUME OPACITY OBSERVATION RECORD

Test Run No. 19-4/SASS

LOCATION NO. 19 OBSERVER MBH /HJB

OWNER ______ BOILER NO. ______ CAPACITY ______ klb/hr

DATE 3/23/77 FUEL TYPE ______ BURNER TYPE ______

POINT OF EMISSION ______

POINT OF OBSERVATION ~100' East of emission point

| TEST | | | Test Load k#/hr | Opacity % | WIND | | Sky Cond. | Sun Position | Comments |
|---|---|---|---|---|---|---|---|---|---|
| No. | Time am/pm | Type | | | Speed mph | Direct. | | | |
| 1 | 09:30 | | | 5 | 20-30<br>(50 mph gusts) | S.W. | CLEAR | | |
| 2 | 10:30 | | | 5 | ↓ | ↓ | | | |
| 3 | 11:30 | | | 5 | | | | | |
| 4 | 12:30 | | | 5 | | | | | |
| 5 | 13:30 | | | 5 | | | | | |
| 6 | 14:30 | | | 5 | | | | | |
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## VELOCITY TRAVERSE

Project: ____
Date: ____
Location: 19
Unit: 1
Test: 19-1,3
Fuel: #2 OIL
Test Description: ____
Personnel: ____
Barometric Press. (in. Hg): ____
Absolute Static Press. in Stack (in. Hg): ____ ($P_s$)
Pitot Tube Coefficient: .83 ($C_p$)

$$V_S = 85.48\, C_p \left[\frac{T_S \Delta P}{P_S M_S}\right]^{1/2}$$

Stack Cross Section

| Time | Traverse Point Port | Depth | Velocity Head (in. $H_2O$) | Gas Temp. (°F) | Gas Temp. (°R) | Molecular Wt. | Velocity (ft/sec) | $O_2$ Conc. (% Dry) |
|---|---|---|---|---|---|---|---|---|
| | | | $\Delta P$ | | $T_S$ | $M_S$ | $V_S$ | |
| | 0 | | .060 | 460 | 920 | | | 3.17 |
| | 2 | | .085 | 450 | 910 | | 25.5 | 3.20 |
| | 4 | | | | | | | 3.15 |
| | 6 | | .085 | 462 | 922 | | 25.7 | 3.16 |
| | 8 | | | | | | | 3.16 |
| | 10 | | | | | | | 3.17 |
| | 12 | | .085 | 470 | 930 | | 25.8 | 3.13 |
| | 14 | | | | | | | 3.13 |
| | 16 | | | | | | | 3.14 |
| | 18 | | .090 | 475 | 935 | | 26.6 | 3.13 |
| | 20 | | | | | | | 3.10 |
| | 22 | | | | | | | 3.08 |
| | 24 | | .085 | 460 | 920 | | 25.6 | 3.08 |
| | 26 | | | | | | | 3.08 |
| | 28 | | | | | | | 3.07 |
| | | | | | | | | |

6002-13

## VELOCITY TRAVERSE

Project:
Test Description:
Date: 1-19-77
Location: 19
Unit: 1
Test: 19 - 74, 75
Personnel:
Fuel: #2 OIL
Barometric Press. (in. Hg):
Absolute Static Press. in Stack (in. Hg): ($P_s$)
Pitot Tube Coefficient: ($C_p$)

$$V_s = 85.48\, C_p \left[\frac{T_s \Delta P}{P_s M_s}\right]^{1/2}$$

Stack Cross Section

| Time | Traverse Point Port | Depth | Velocity Head (in. $H_2O$) | Gas Temp. (°F) | Gas Temp. (°R) | Molecular Wt. | Velocity (ft/sec) | $O_2$ Conc. (% Dry) |
|---|---|---|---|---|---|---|---|---|
| | | | $\Delta P$ | | $T_s$ | $M_s$ | $V_s$ | |
| | | 2 | .08 | | | | | 1.33 |
| | | 7 | .085 | | | | | 1.30 |
| | | 12 | .085 | | | | | 1.25 |
| | | 17 | .085 | 465 | 925 | | | 1.24 |
| | | 22 | .085 | | | | | 1.30 |
| | | 27 | .07 | | | | | 1.40 |
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6002-13

# VELOCITY TRAVERSE

**Project:**

**Date:** 1-20-77

**Location:** 19

**Unit:** 1

**Test:** 19-83,84

**Fuel:** #2 OIL

**Barometric Press. (in. Hg):** 29.8

**Absolute Static Press. in Stack (in. Hg):** ($P_s$)

**Pitot Tube Coefficient:** .83 ($C_p$)

**Test Description:**

**Personnel:**

$$V_s = 85.48\ C_p \left[\frac{T_s \Delta P}{P_s M_s}\right]^{1/2}$$

**Stack Cross Section**

| Time | Traverse Port | Point Depth | Velocity Head (in. $H_2O$) | Gas Temp. (°F) | Gas Temp. (°R) | Molecular Wt. | Velocity (ft/sec) | $O_2$ Conc. (% Dry) |
|---|---|---|---|---|---|---|---|---|
| | | | $\Delta P$ | | $T_s$ | $M_s$ | $V_s$ | |
| | | 2 | .09 | 505 | 965 | | | |
| | | 7 | .1 | 520 | 980 | | | |
| | | 12 | .095 | 520 | 980 | | | |
| | | 17 | .09 | 530 | 990 | | | |
| | | 22 | .085 | 525 | 985 | | | |
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6002-13

## VELOCITY TRAVERSE

Project:
Date: 1-24-77
Location: 19
Unit: 1
Test: 19- 97, 98
Fuel: #6 OIL
Test Description:
Personnel: R. PIONESSA
Barometric Press. (in. Hg): 30.16
Absolute Static Press. in Stack (in. Hg): (P$_s$)
Pitot Tube Coefficient: .83 (C$_p$)

$$V_S = 85.48\ C_p \left[\frac{T_S \Delta P}{P_S M_S}\right]^{1/2}$$

Stack Cross Section

| Time | Traverse Point Port | Traverse Point Depth | Velocity Head (in. $H_2O$) | Gas Temp. (°F) | Gas Temp. (°R) | Molecular Wt. | Velocity (ft/sec) | $O_2$ Conc. (% Dry) |
|---|---|---|---|---|---|---|---|---|
| | | | $\Delta P$ | | $T_S$ | $M_S$ | $V_S$ | |
| | | 2 | .095 | 485 | 945 | | | 2.89 |
| | | 7 | .095 | 485 | 945 | | | 2.94 |
| | | 12 | .095 | 485 | 945 | | | 2.97 |
| | | 17 | .100 | 485 | 945 | | | 3.00 |
| | | 22 | .095 | | | | | 3.00 |
| | | 27 | .105 | 485 | 945 | | | 3.00 |
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6002-13

## VELOCITY TRAVERSE

Project:

Test Description:

Date: 1-26-77

Location: 19

Unit: 1

Test: 19-116

Personnel:

Fuel: #2 oil

Barometric Press. (in. Hg): 29.72

Absolute Static Press. in Stack (in. Hg): -.225 ($P_s$)

Pitot Tube Coefficient: 0.83 ($C_p$)

$$V_S = 85.48\ C_p \left[\frac{T_S \Delta P}{P_S M_S}\right]^{1/2}$$

Stack Cross Section

| Time | Traverse Point Port | Depth | Velocity Head (in. $H_2O$) | Gas Temp. (°F) | Gas Temp. (°R) | Molecular Wt. | Velocity (ft/sec) | $O_2$ Conc. (% Dry) |
|---|---|---|---|---|---|---|---|---|
| | | inch | $\Delta P$ | | $T_S$ | $M_S$ | $V_S$ | |
| | | 2 | 0.105 | 485 | | | | |
| | | 7 | 0.109 | 490 | | | | |
| | | 12 | 0.106 | 495 | | | | |
| | | 17 | 0.112 | 497 | | | | |
| | | 22 | 0.116 | 498 | | | | |
| | | 27 | 0.102 | 480 | | | | |
| | | Av. | 0.108 | 491 | 951 | | | |
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6002-13

# VELOCITY TRAVERSE

Project:
Date: 2·17·77
Location: 19
Unit: 1
Test: 19-132
Fuel: #6 o.1

Test Description:

Personnel: G Setter

Barometric Press. (in. Hg): 30.12
Absolute Static Press. in Stack (in. ~~Hg~~ $H_2O$): -0.23 ($P_s$)
Pitot Tube Coefficient: 0.83 ($C_p$)

$$V_s = 85.48\ C_p \left[\frac{T_s \Delta P}{P_s M_s}\right]^{1/2}$$

Stack Cross Section

| Time | Traverse Port | Point Depth | Velocity Head (in. $H_2O$) | Gas Temp. (°F) | Gas Temp. (°R) | Molecular Wt. | Velocity (ft/sec) | $O_2$ Conc. (% Dry) |
|---|---|---|---|---|---|---|---|---|
| | | inch | $\Delta P$ | | $T_s$ | $M_s$ | $V_s$ | |
| | | 2 | 0.07 | 445 | | | | |
| | | 7 | 0.065 | 455 | | | | |
| | | 12 | 0.07 | 460 | | | | |
| | | 17 | 0.072 | 460 | | | | |
| | | 22 | 0.08 | 460 | | | | |
| | | 27 | 0.06 | 460 | | | | |
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6002-13

## VELOCITY TRAVERSE

Project: ________

Test Description: ____

Date: 2-21-77

Location: 19

Unit: ________

Test: 19-143

Personnel: ________

Fuel: #6 oil

Barometric Press. (in. Hg): 29.81

Absolute Static Press. in Stack (in. ~~Hg~~ $H_2O$): -0.2 ($P_s$)

Pitot Tube Coefficient: 0.83 ($C_p$)

$$V_s = 85.48\, C_p \left[\frac{T_s \Delta P}{P_s M_s}\right]^{1/2}$$

Stack Cross Section

| Time | Traverse Point Port | Traverse Point Depth | Velocity Head (in. $H_2O$) | Gas Temp. (°F) | Gas Temp. (°R) | Molecular Wt. | Velocity (ft/sec) | $O_2$ Conc. (% Dry) |
|---|---|---|---|---|---|---|---|---|
| | | inch | ΔP | | $T_s$ | $M_S$ | $V_S$ | |
| | | 2 | 0.09 | 460 | | | | |
| | | 7 | 0.09 | 465 | | | | |
| | | 12 | 0.085 | 470 | | | | |
| | | 17 | 0.095 | 470 | | | | |
| | | 22 | 0.1 | 470 | | | | |
| | | 27 | 0.075 | 460 | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | Avel. | | 0.089 | 467 | | | | |
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6002-13

## VELOCITY TRAVERSE

**Project:** ______

**Test Description:** Mcl6 5

**Date:** 2-23-77

**Location:** 19

**Unit:** 1

**Test:** 19-159

**Personnel:** R. P.

**Fuel:** ______

**Barometric Press. (in. Hg):** 30.08

**Absolute Static Press. in Stack (in. ~~Hg~~ $H_2O$):** -.23 ($P_s$)

**Pitot Tube Coefficient:** 0.83 ($C_p$)

$$V_S = 85.48\, C_p \left[\frac{T_S \Delta P}{P_S M_S}\right]^{1/2}$$

Stack Cross Section

| Time | Traverse Point Port | Depth | Velocity Head (in. $H_2O$) | Gas Temp. (°F) | Gas Temp. (°R) | Molecular Wt. | Velocity (ft/sec) | $O_2$ Conc. (% Dry) |
|---|---|---|---|---|---|---|---|---|
| | | inch | $\Delta P$ | | $T_S$ | $M_S$ | $V_S$ | |
| | 1 | -2 | 0.085 | 485 | | | | |
| | | -7 | 0.095 | 500 | | | | |
| | | -12 | 0.09 | 510 | | | | |
| | | -17 | 0.09 | 515 | | | | |
| | | -22 | 0.09 | 515 | | | | |
| | | -27 | 0.085 | 500 | | | | |
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6002-13

## VELOCITY TRAVERSE

**Project:** 19-170
**Date:** 3-1-77
**Location:** 19
**Unit:** 1
**Test:** 19-170
**Fuel:** #6 oil
**Barometric Press. (in. Hg):** 29.98
**Absolute Static Press. in Stack (in. ~~Hg~~ $H_2O$):** -0.22 ($P_s$)
**Pitot Tube Coefficient:** 0.83 ($C_p$)

**Test Description:**

**Personnel:**

$$V_s = 85.48\ C_p \left[\frac{T_s \Delta P}{P_s M_s}\right]^{1/2}$$

**Stack Cross Section**

| Time | Traverse Point Port | Traverse Point Depth | Velocity Head (in. $H_2O$) | Gas Temp. (°F) | Gas Temp. (°R) | Molecular Wt. | Velocity (ft/sec) | $O_2$ Conc. (% Dry) |
|---|---|---|---|---|---|---|---|---|
|  |  | inch | $\Delta P$ |  | $T_s$ | $M_s$ | $V_s$ |  |
|  |  | 2 | 0.11 | 500 |  |  |  |  |
|  |  | 7 | 0.12 | 510 |  |  |  |  |
|  |  | 12 | 0.12 | 512 |  |  |  |  |
|  |  | 17 | 0.11 | 512 |  |  |  |  |
|  |  | 22 | 0.12 | 512 |  |  |  |  |
|  |  | 27 | 0.10 | 600 |  |  |  |  |
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6002-13

## VELOCITY TRAVERSE

**Project:**

**Test Description:**

**Date:** 3-3-77

**Location:** 19

**Unit:** 1

**Test:** 19-179

**Personnel:** G. S.

**Fuel:** #2 oil

**Barometric Press. (in. Hg):** 30.34

**Absolute Static Press. in Stack (in. ~~Hg~~ $H_2O$):** -0.23 ($P_s$)

**Pitot Tube Coefficient:** 0.83 ($C_p$)

$$V_S = 85.48\ C_p \left[\frac{T_S \Delta P}{P_S M_S}\right]^{1/2}$$

**Stack Cross Section**

| Time | Traverse Point Port | Traverse Point Depth | Velocity Head (in. $H_2O$) | Gas Temp. (°F) | Gas Temp. (°R) | Molecular Wt. | Velocity (ft/sec) | $O_2$ Conc. (% Dry) |
|---|---|---|---|---|---|---|---|---|
| | | inch | $\Delta P$ | | $T_S$ | $M_S$ | $V_S$ | |
| | | 2 | 0.11 | 495 | | | | |
| | | 7 | 0.12 | 505 | | | | |
| | | 12 | 0.11 | 520 | | | | |
| | | 17 | 0.11 | 520 | | | | |
| | | 22 | 0.10 | 520 | | | | |
| | | 27 | 0.10 | 520 | | | | |
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6002-13

## VELOCITY TRAVERSE

Project:

Date: 3-7-77

Location: 19

Unit: 1

Test: 19-190

Fuel: Nat. Gas

Test Description:

Personnel:

Barometric Press. (in. Hg): 30.07

Absolute Static Press. in Stack (in. Hg): -0.23 ($P_s$)

Pitot Tube Coefficient: 0.83 ($C_p$)

$$V_s = 85.48\ C_p \left[\frac{T_s \Delta P}{P_s M_s}\right]^{1/2}$$

Stack Cross Section

| Time | Traverse Point Port | Traverse Point Depth | Velocity Head (in. $H_2O$) | Gas Temp. (°F) | Gas Temp. (°R) | Molecular Wt. | Velocity (ft/sec) | $O_2$ Conc. (% Dry) |
|---|---|---|---|---|---|---|---|---|
| | | inch. | $\Delta P$ | | $T_s$ | $M_s$ | $V_s$ | |
| | | 2 | 0.11 | 510 | | | | |
| | | 7 | 0.11 | 510 | | | | |
| | | 12 | 0.115 | 510 | | | | |
| | | 17 | 0.12 | 505 | | | | |
| | | 22 | 0.11 | 500 | | | | |
| | | 27 | 0.11 | 500 | | | | |
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6002-13

## VELOCITY TRAVERSE

**Project:**

**Date:** 3-8-77

**Location:** 19

**Unit:** 1

**Test:** 19-193

**Fuel:** Nat. Gas

**Test Description:**

**Personnel:**

**Barometric Press. (in. Hg):** 30.28

**Absolute Static Press. in Stack (in. ~~Hg~~ $H_2O$):** -0.225 ($P_s$)

**Pitot Tube Coefficient:** 0.83 ($C_p$)

$$V_s = 85.48\, C_p \left[\frac{T_s \Delta P}{P_s M_s}\right]^{1/2}$$

**Stack Cross Section**

| Time | Traverse Point Port | Traverse Point Depth | Velocity Head (in. $H_2O$) | Gas Temp. (°F) | Gas Temp. (°R) | Molecular Wt. | Velocity (ft/sec) | $O_2$ Conc. (% Dry) |
|---|---|---|---|---|---|---|---|---|
| | | inch. | $\Delta P$ | | $T_s$ | $M_s$ | $V_s$ | |
| | | 2 | 0.11 | 480 | | | | |
| | | 7 | 0.115 | 490 | | | | |
| | | 12 | 0.115 | 495 | | | | |
| | | 17 | 0.12 | 495 | | | | |
| | | 22 | 0.12 | 495 | | | | |
| | | 27 | 0.11 | 495 | | | | |
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6002-13

Date 1/5/77

**K V B. INC.**

Test No. 19-3

## SOx DATA SHEET

TEST NO. 19-3 UNIT NO.____ FUEL____ LOAD_____klb/hr____ Location 19

CAL. BOTTLE 1120 ppm ± 2%

| | | | | | |
|---|---|---|---|---|---|
| Box No. | X-1 | X-1 | | | |
| Time | 1105 | 1125 | | | |
| Temp. in Gas Meter | 62 | 69 | | | |
| Press. in Gas Meter | 0 | 0 | | | |
| Meter Reading | 0.000 | 1.000 | | | |
| Barom. Press. | 30.08 | 30.08 | | | |
| Percent Oxygen | | | | | |
| $N_2$ Purge Time | 1210 | 1230 | | | |

Calculation: $SO_3$ or $SO_2$, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V (P + p)}$

Excess $O_2$ ______%

| | $SO_2$ | $SO_3$ | $SO_x$ |
|---|---|---|---|
| A = Ml of lead perchlorate used for sample = | 26.50 | 2.7 | |
| B = Ml of lead perchlorate used for bland = | 2.45 | | |
| N = Normality of lead perchlorate titrant = | | | |
| F = Dilution factor = | 10 | 1 | |
| T = Average temp. in gas meter = | | | |
| V = Volume of gas sample $ft^3$ = | | | |
| P = Barometric pressure = | | | |
| p = Pressure in gas meter = | | | |
| Concentration, C, ppm = | 1087 | 1.1 | |
| , gm/dscm = | | | |
| Emission, E, g/Mcal = | | | |
| lb/MBtu = | | | |
| ng/J = | | | |

$E = CF\left[\frac{2090}{20.9 - \%O_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = __________ dscm/$10^4$ cal

__________ dscf/$10^4$ Btu

from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

Date 1/5/77 **K V B. INC.** Test No. 19-3

## SOx DATA SHEET

TEST NO. 19-3 UNIT NO. ____ FUEL ____ LOAD ____ klb/hr ____ Location 19

CAL BOTTLE 1120ppm ±2%

| | | | | | |
|---|---|---|---|---|---|
| Box No. | X-2 | X-2 | | | |
| Time | 1130 | 1144 | | | |
| Temp. in Gas Meter | 68 | 72 | | | |
| Press. in Gas Meter | | | | | |
| Meter Reading | 0.000 | 1.000 | | | |
| Barom. Press. | | | | | |
| Percent Oxygen | | | | | |
| $N_2$ Purge Time | 1145 | 1205 | | | |

Calculation: $SO_3$ or $SO_2$, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V (P + p)}$

Excess $O_2$ ______%

| | $SO_2$ | $SO_3$ | $SO_x$ |
|---|---|---|---|
| A = Ml of lead perchlorate used for sample = | 27.7 | 2.65 | |
| B = Ml of lead perchlorate used for bland = | | | |
| N = Normality of lead perchlorate titrant = | | | |
| F = Dilution factor = | | | |
| T = Average temp. in gas meter = | | | |
| V = Volume of gas sample $ft^3$ = | | | |
| P = Barometric pressure = | | | |
| p = Pressure in gas meter = | | | |
| Concentration, C, ppm = | 1156 | 0.91 | |
| , gm/dscm = | | | |
| Emission, E, g/Mcal = | | | |
| lb/MBtu = | | | |
| ng/J = | | | |

$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = ________ dscm/$10^4$ cal

________ dscf/$10^4$ Btu

from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

Date 1/6/77

**K V B. INC.**

Test No. 19-5

## SOx DATA SHEET

TEST NO. 19-5 UNIT NO. _____ FUEL #2 OIL LOAD _____ klb/hr _____ Location 19

| | START | FINISH | | | |
|---|---|---|---|---|---|
| Box No. | x-1 | x-1 | | | |
| Time | 0930 | 0953 | | | |
| Temp. in Gas Meter | 29 | 36 | | | |
| Press. in Gas Meter | 6 | 0 | | | |
| Meter Reading | 0.000 | 3.000 | | | |
| Barom. Press. | 30.19 | 30.19 | | | |
| Percent Oxygen | 3.12 | 3.12 | | | |
| $N_2$ Purge Time | 1000 | 1020 | | | |

Calculation: $SO_3$ or $SO_2$, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess $O_2$ _______ %

| | $SO_2$ | $SO_3$ | $SO_x$ |
|---|---|---|---|
| A = Ml of lead perchlorate used for sample = | 9.0 | 3.2 | |
| B = Ml of lead perchlorate used for bland = | 2.50 | | |
| N = Normality of lead perchlorate titrant = | 0.01079 | | |
| F = Dilution factor = | 10 | 1 | |
| T = Average temp. in gas meter = | | | |
| V = Volume of gas sample ft$^3$ = | | | |
| P = Barometric pressure = | | | |
| p = Pressure in gas meter = | | | |
| Concentration, C, ppm = | 91.6 | 1.0 | |
| , gm/dscm = | | | |
| Emission, E, g/Mcal = | | | |
| lb/MBtu = | | | |
| ng/J = | | | |

$$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$$

where

C = pollutant concentration, g/dscm

F, volume factor = __________ dscm/$10^4$ cal

__________ dscf/$10^4$ Btu

from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

Date 1/6/77

K V B. INC.

Test No. 19-5

## SOx DATA SHEET

TEST NO. 19-5 UNIT NO.____ FUEL #2 OIL LOAD____klb/hr____Location____

| | | | | | |
|---|---|---|---|---|---|
| Box No. | x-2 | x-2 | | | |
| Time | 0958 | 1029 | | | |
| Temp. in Gas Meter | 34 | 34 | | | |
| Press. in Gas Meter | 0 | 0 | | | |
| Meter Reading | 0.000 | 3.000 | | | |
| Barom. Press. | 30.19 | 30.19 | | | |
| Percent Oxygen | 3.12 | 3.12 | | | |
| $N_2$ Purge Time | 1035 | 1055 | | | |

Calculation: $SO_3$ or $SO_2$, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V (P + p)}$

Excess $O_2$ 3.12 %

| | $SO_2$ | $SO_3$ | $SO_x$ |
|---|---|---|---|
| A = Ml of lead perchlorate used for sample = | 9.0 | 3.10 | |
| B = Ml of lead perchlorate used for bland = | | | |
| N = Normality of lead perchlorate titrant = | | | |
| F = Dilution factor = | 10 | 1 | |
| T = Average temp. in gas meter = | | | |
| V = Volume of gas sample ft$^3$ = | | | |
| P = Barometric pressure = | | | |
| p = Pressure in gas meter = | | | |
| Concentration,C, ppm = | 91.6 | 0.85 | |
| ,gm/dscm = | | | |
| Emission ,E, g/Mcal = | | | |
| lb/MBtu = | | | |
| ng/J = | | | |

$E = CF\left[\frac{2090}{20.9 - \%O_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = ________dscm/10$^4$ cal

________dscf/10$^4$ Btu

from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

Date 1/6/77

**K V B. INC.**

Test No. 19-5

## SOx DATA SHEET

TEST NO. 19-5 UNIT NO.____ FUEL #2 oil LOAD_____klb/hr____Location_____

| | | | | | |
|---|---|---|---|---|---|
| Box No. | X-1 | x-1 | | | |
| Time | 1030 | 1055 | | | |
| Temp. in Gas Meter | 34 | 38 | | | |
| Press. in Gas Meter | 0 | 0 | | | |
| Meter Reading | 0.000 | 3.000 | | | |
| Barom. Press. | 30.19 | 30.19 | | | |
| Percent Oxygen | 3.12 | 3.12 | | | |
| $N_2$ Purge Time | 1100 | 1125 | | | |

Calculation: $SO_3$ or $SO_2$, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess $O_2$ ______%

| | $SO_2$ | $SO_3$ | $SO_x$ |
|---|---|---|---|
| A = Ml of lead perchlorate used for sample = | 8.7 | 3.5 | |
| B = Ml of lead perchlorate used for bland = | | | |
| N = Normality of lead perchlorate titrant = | | | |
| F = Dilution factor = | 10 | 1 | |
| T = Average temp. in gas meter = | | | |
| V = Volume of gas sample $ft^3$ = | | | |
| P = Barometric pressure = | | | |
| p = Pressure in gas meter = | | | |
| Concentration,C, ppm = | 829 | 1.4 | |
| ,gm/dscm = | | | |
| Emission ,E, g/Mcal = | | | |
| lb/MBtu = | | | |
| ng/J = | | | |

$$E = CF\left[\frac{2090}{20.9 - \%O_2}\right]$$

where

C = pollutant concentration, g/dscm
F, volume factor = __________dscm/$10^4$ cal

__________dscf/$10^4$ Btu

from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

Date 1-19-77

**K V B. INC.**

Test No. 19-74

SOx DATA SHEET

TEST NO. 19-74 UNIT NO. ____ FUEL #2OIL LOAD ____ klb/hr ____ Location 19

| | | | | | |
|---|---|---|---|---|---|
| Box No. | X-1 | X-1 | | | |
| Time | 1115 | 1130 | | | |
| Temp. in Gas Meter | 70 | 72 | | | |
| Press. in Gas Meter | 0 | 0 | | | |
| Meter Reading | 0 | 1.0 | | | |
| Barom. Press. | 29.73 | 29.73 | | | |
| Percent Oxygen | | | | | |
| $N_2$ Purge Time | 1134 | 1201 | | | |

Calculation: $SO_3$ or $SO_2$, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess $O_2$ ______%

| | | $SO_2$ | $SO_3$ | $SO_x$ |
|---|---|---|---|---|
| A = Ml of lead perchlorate used for sample | = | 10.2 | 32.6 | |
| B = Ml of lead perchlorate used for bland | = | 9.5 | 9.5 | |
| N = Normality of lead perchlorate titrant | = | 0.01079 | 0.01079 | |
| F = Dilution factor | = | 10 | 1 | |
| T = Average temp. in gas meter (°R) | = | 531 | 531 | |
| V = Volume of gas sample $ft^3$ | = | 1.0 | 1.0 | |
| P = Barometric pressure | = | 29.73 | 29.73 | |
| p = Pressure in gas meter | = | 0 | 0 | |
| Concentration, C, ppm | = | 33 | 106.8 | |
| , gm/dscm | = | | | |
| Emission, E, g/Mcal | = | | | |
| lb/MBtu | = | | | |
| ng/J | = | | | |

$$E = CF\left[\frac{2090}{20.9-xO_2}\right]$$

where

C = pollutant concentration, g/dscm

F, volume factor = ________ dscm/$10^4$ cal

________ dscf/$10^4$ Btu

BAD PURGE: DELETE

from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

Date 1-19-77

**K V B. INC.**

Test No. 19-74

## SOx DATA SHEET

TEST NO. 1974 UNIT NO. ____ FUEL #2 OIL LOAD ____ klb/hr ____ Location 19

| | START | FINISH | | | |
|---|---|---|---|---|---|
| Box No. | X-2 | X-2 | | | |
| Time | 1143 | 1200 | | | |
| Temp. in Gas Meter | 80 | 78 | | | |
| Press. in Gas Meter | 0 | 0 | | | |
| Meter Reading | 0 | 1.0 | | | |
| Barom. Press. | 29.73 | 29.73 | | | |
| Percent Oxygen | | | | | |
| $N_2$ Purge Time | 1205 | 1231 | | | |

Calculation: $SO_3$ or $SO_2$, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess $O_2$ ____ %

| | $SO_2$ | $SO_3$ | $SO_x$ |
|---|---|---|---|
| A = Ml of lead perchlorate used for sample = | 12.2 | 10.1 | |
| B = Ml of lead perchlorate used for bland = | 9.5 | 9.5 | |
| N = Normality of lead perchlorate titrant = | 0.01079 | 0.01079 | |
| F = Dilution factor = | 10 | 1 | |
| T = Average temp. in gas meter (°R) = | 539 | 539 | |
| V = Volume of gas sample $ft^3$ = | 1.0 | 1.0 | |
| P = Barometric pressure = | 29.73 | 29.73 | |
| p = Pressure in gas meter = | 0 | 0 | |
| Concentration, C, ppm = | 126.7 | 2.8 | |
| , gm/dscm = | | | |
| Emission, E, g/Mcal = | | | |
| lb/MBtu = | | | |
| ng/J = | | | |

$$E = CF\left[\frac{2090}{20.9 - \%O_2}\right]$$

where

C = pollutant concentration, g/dscm

F, volume factor = ____ dscm/$10^4$ cal

____ dscf/$10^4$ Btu

from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

Date 1-19-77

**K V B. INC.**

Test No. 19-74

## SOx DATA SHEET

TEST NO. 19-74 UNIT NO. ____ FUEL #2OIL LOAD ____ klb/hr ____ Location 19

| | | | | | |
|---|---|---|---|---|---|
| Box No. | X-1 | X-1 | | | |
| Time | 1215 | 1230 | | | |
| Temp. in Gas Meter | 80 | 80 | | | |
| Press. in Gas Meter | 0 | 0 | | | |
| Meter Reading | 0 | 1.0 | | | |
| Barom. Press. | 29.73 | 29.73 | | | |
| Percent Oxygen | | | | | |
| $N_2$ Purge Time | 1235 | 1205 | | | |

Calculation: $SO_3$ or $SO_2$, ppm $= \dfrac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess $O_2$ ____%

| | | $SO_2$ | $SO_3$ | $SO_x$ |
|---|---|---|---|---|
| A = Ml of lead perchlorate used for sample | = | 10.9 | 31.5 | |
| B = Ml of lead perchlorate used for bland | = | 9.5 | 9.5 | |
| N = Normality of lead perchlorate titrant | = | 0.01079 | 0.01079 | |
| F = Dilution factor | = | 10 | 1 | |
| T = Average temp. in gas meter (°R) | = | 540 | 540 | |
| V = Volume of gas sample $ft^3$ | = | 1.0 | 1.0 | |
| P = Barometric pressure | = | 29.73 | 29.73 | |
| p = Pressure in gas meter | = | 0 | 0 | |
| Concentration, C, ppm | = | 65.8 | 103.4 | |
| , gm/dscm | = | | | |
| Emission, E, g/Mcal | = | | | |
| lb/MBtu | = | | | |
| ng/J | = | | | |

$E = CF\left[\dfrac{2090}{20.9 - xO_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = ____________ dscm/$10^4$ cal

____________ dscf/$10^4$ Btu

from Fed. Reg. 9/11/74 p 32856

BAD PURGE: DELETE

60-14
rev. 1/2/75

Date 1-20-77

K V B. INC.

Test No. 19-78

## SOx DATA SHEET

TEST NO. 19-78 UNIT NO._____ FUEL #2 OIL LOAD______klb/hr____Location 19

CAL BOTTLE 1120 PPM ± 2%

| | | | | | |
|---|---|---|---|---|---|
| Box No. | X-1 | X-1 | | | |
| Time | 0822 | 0835 | | | |
| Temp. in Gas Meter | 71 | 70 | | | |
| Press. in Gas Meter | 0 | 0 | | | |
| Meter Reading | 0 | 1.05 | | | |
| Barom. Press. | 29.80 | 29.80 | | | |
| Percent Oxygen | 0 | 0 | | | |
| $N_2$ Purge Time | 0847 | 0913 | | | |

Calculation: $SO_3$ or $SO_2$, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V (P + p)}$

Excess $O_2$ 0 %

| | | $SO_2$ | $SO_3$ | $SO_x$ |
|---|---|---|---|---|
| A = Ml of lead perchlorate used for sample | = | 36.4 | 10.7 | |
| B = Ml of lead perchlorate used for bland | = | 9.0 | 9.0 | |
| N = Normality of lead perchlorate titrant | = | .01079 | .01079 | |
| F = Dilution factor | = | 10 | 1 | |
| T = Average temp. in gas meter | = | 531°R | 531°R | |
| V = Volume of gas sample $ft^3$ | = | 1.05 | 1.05 | |
| P = Barometric pressure | = | 29.80 | 29.80 | |
| p = Pressure in gas meter | = | 0 | 0 | |
| Concentration,C, ppm | = | 1204 | 7 | |
| ,gm/dscm | = | | | |
| Emission ,E, g/Mcal | = | | | |
| lb/MBtu | = | | | |
| ng/J | = | | | |

$E = CF\left[\frac{2090}{20.9 - \%O_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = __________dscm/$10^4$ cal

__________dscf/$10^4$ Btu

from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

Date 1-20-78

**K V B. INC.**

Test No. 19-78

## SOx DATA SHEET

TEST NO. 19-78 UNIT NO. ____ FUEL #2 OIL LOAD ____ klb/hr ____ Location 19

| | | | | | |
|---|---|---|---|---|---|
| Box No. | X-2 | X-2 | | | |
| Time | 0924 | 0937 | | | |
| Temp. in Gas Meter | 78 | 76 | | | |
| Press. in Gas Meter | 0 | 0 | | | |
| Meter Reading | 0 | 1.0 | | | |
| Barom. Press. | 29.80 | 29.80 | | | |
| Percent Oxygen | 0 | 0 | | | |
| $N_2$ Purge Time | 0944 | 1007 | | | |

Calculation: $SO_3$ or $SO_2$, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V (P + p)}$

Excess $O_2$ 0 %

| | $SO_2$ | $SO_3$ | $SO_x$ |
|---|---|---|---|
| A = Ml of lead perchlorate used for sample = | 33.6 | 10.1 | |
| B = Ml of lead perchlorate used for bland = | 9.0 | 9.0 | |
| N = Normality of lead perchlorate titrant = | .01079 | .01079 | |
| F = Dilution factor = | 10 | 1 | |
| T = Average temp. in gas meter = | 537 | 537 | |
| V = Volume of gas sample $ft^3$ = | 1.0 | 1.0 | |
| P = Barometric pressure = | 29.80 | 29.80 | |
| p = Pressure in gas meter = | 0 | 0 | |
| Concentration, C, ppm = | 1147 | 5 | |
| ,gm/dscm = | | | |
| Emission, E, g/Mcal = | | | |
| lb/MBtu = | | | |
| ng/J = | | | |

$$E = CF\left[\frac{2090}{20.9-\%O_2}\right]$$

where

C = pollutant concentration, g/dscm

F, volume factor = ________ dscm/$10^4$ cal

________ dscf/$10^4$ Btu

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K V B. INC.

Test No. 19-83

## SOx DATA SHEET

TEST NO. 19-83 UNIT NO. ____ FUEL #2 OIL LOAD 14.5 klb/hr ____ Location 19

| | | | | | |
|---|---|---|---|---|---|
| Box No. | Z-1 | Z-1 | | | |
| Time | 1420 | 1434 | | | |
| Temp. in Gas Meter | 83 | 83 | | | |
| Press. in Gas Meter | 0 | 0 | | | |
| Meter Reading | 0 | 1.0 | | | |
| Barom. Press. | 29.80 | 29.80 | | | |
| Percent Oxygen | .9 | .9 | | | |
| $N_2$ Purge Time | 1440 | 1500 | | | |

Calculation: $SO_3$ or $SO_2$, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V (P + p)}$

Excess $O_2$ 0.9 %

| | $SO_2$ | $SO_3$ | $SO_x$ |
|---|---|---|---|
| A = Ml of lead perchlorate used for sample = | 5.9 | 4.8 | |
| B = Ml of lead perchlorate used for bland = | 3.5 | 3.5 | |
| N = Normality of lead perchlorate titrant = | .01079 | .01079 | |
| F = Dilution factor = | 10 | 1 | |
| T = Average temp. in gas meter = | 543 | 543 | |
| V = Volume of gas sample $ft^3$ = | 1.0 | 1.0 | |
| P = Barometric pressure = | 29.80 | 29.80 | |
| p = Pressure in gas meter = | 0 | 0 | |
| Concentration, C, ppm = | 113 | 6.1 | |
| , gm/dscm = | | | |
| Emission, E, g/Mcal = | | | |
| lb/MBtu = | | | |
| ng/J = | | | |

$E = CF\left[\frac{2090}{20.9 - \%O_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = ________ dscm/$10^4$ cal

________ dscf/$10^4$ Btu

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K V B. INC.

Test No. 19-83

## SOx DATA SHEET

TEST NO. 19-83 UNIT NO. ____ FUEL #2 oil LOAD 14.5 klb/hr ____ Location 19

| | | | | | |
|---|---|---|---|---|---|
| Box No. | X-2 | X-2 | | | |
| Time | 1444 | 1458 | | | |
| Temp. in Gas Meter | 84 | 88 | | | |
| Press. in Gas Meter | 0 | 0 | | | |
| Meter Reading | 0 | 1.0 | | | |
| Barom. Press. | 29.80 | 29.80 | | | |
| Percent Oxygen | .9 | .9 | | | |
| $N_2$ Purge Time | 1503 | 1525 | | | |

Calculation: $SO_3$ or $SO_2$, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess $O_2$ .9 %

| | | $SO_2$ | $SO_3$ | $SO_x$ |
|---|---|---|---|---|
| A = Ml of lead perchlorate used for sample | = | 5.8 | 4.6 | |
| B = Ml of lead perchlorate used for bland | = | 3.5 | 3.5 | |
| N = Normality of lead perchlorate titrant | = | .01079 | .01079 | |
| F = Dilution factor | = | 10 | 1 | |
| T = Average temp. in gas meter | = | 546 | 546 | |
| V = Volume of gas sample $ft^3$ | = | 1.0 | 1.0 | |
| P = Barometric pressure | = | 29.80 | 29.80 | |
| p = Pressure in gas meter | = | 0 | 0 | |
| Concentration, C, ppm | = | 109 | 5.2 | |
| , gm/dscm | = | | | |
| Emission, E, g/Mcal | = | | | |
| lb/MBtu | = | | | |
| ng/J | = | | | |

$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = ________ dscm/$10^4$ cal

________ dscf/$10^4$ Btu

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K V B. INC.

Test No. 19-83

## SOx DATA SHEET

TEST NO. 19-83 UNIT NO. ____ FUEL #2 OIL LOAD 14.5 klb/hr ____ Location 19

| | | | | | |
|---|---|---|---|---|---|
| Box No. | X-1 | X-1 | | | |
| Time | 1512 | 1524 | | | |
| Temp. in Gas Meter | 90 | 88 | | | |
| Press. in Gas Meter | 0 | 0 | | | |
| Meter Reading | 0 | 1.0 | | | |
| Barom. Press. | 29.80 | 29.80 | | | |
| Percent Oxygen | .9 | .9 | | | |
| $N_2$ Purge Time | | | | | |

Calculation: $SO_3$ or $SO_2$, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess $O_2$ .9 %

| | $SO_2$ | $SO_3$ | $SO_x$ |
|---|---|---|---|
| A = Ml of lead perchlorate used for sample = | 5.2 | 4.6 | |
| B = Ml of lead perchlorate used for bland = | 3.5 | 3.5 | |
| N = Normality of lead perchlorate titrant = | .01079 | .01079 | |
| F = Dilution factor = | 10 | 1 | |
| T = Average temp. in gas meter = | 549 | 549 | |
| V = Volume of gas sample ft$^3$ = | 1.0 | 1.0 | |
| P = Barometric pressure = | 29.80 | 29.80 | |
| p = Pressure in gas meter = | 0 | 0 | |
| Concentration, C, ppm = | 81 | 5.2 | |
| , gm/dscm = | | | |
| Emission, E, g/Mcal = | | | |
| lb/MBtu = | | | |
| ng/J = | | | |

$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = ____________ dscm/$10^4$ cal

____________ dscf/$10^4$ Btu

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KVB. INC.

Test No. 19-97

## SOx DATA SHEET

TEST NO. 19-97 UNIT NO. ____ FUEL #6 OIL LOAD 13.8 klb/hr ____ Location 19

| | | | | | |
|---|---|---|---|---|---|
| Box No. | X-1 | Z-1 | | | |
| Time | 1022 | 1055 | | | |
| Temp. in Gas Meter | 86 | 87 | | | |
| Press. in Gas Meter | 0 | 0 | | | |
| Meter Reading | 0 | 2.700 | | | |
| Barom. Press. | 30.16 | 30.16 | | | |
| Percent Oxygen | | | | | |
| $N_2$ Purge Time | 1104 | 1125 | | | |

Calculation: $SO_3$ or $SO_2$, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V (P + p)}$

Excess $O_2$ ______%

| | $SO_2$ | $SO_3$ | $SO_x$ |
|---|---|---|---|
| A = Ml of lead perchlorate used for sample = | 22.1 | 6.1 | |
| B = Ml of lead perchlorate used for bland = | 4.1 | 4.1 | |
| N = Normality of lead perchlorate titrant = | .01079 | .01079 | |
| F = Dilution factor = | 10 | 1 | |
| T = Average temp. in gas meter = | 547 | 547 | |
| V = Volume of gas sample $ft^3$ = | 2.700 | 2.700 | |
| P = Barometric pressure = | 30.16 | 30.16 | |
| p = Pressure in gas meter = | 0 | 0 | |
| Concentration, C, ppm = | 313 | 3.5 | |
| , gm/dscm = | | | |
| Emission, E, g/Mcal = | | | |
| lb/MBtu = | | | |
| ng/J = | | | |

$E = CF\left[\frac{2090}{20.9 - \%O_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = __________ dscm/$10^4$ cal

__________ dscf/$10^4$ Btu

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**K V B. INC.**

Test No. 19-97

## SOx DATA SHEET

TEST NO. 19-97 UNIT NO._____ FUEL #6 LOAD 13.8 klb/hr____ Location______

| | | | | | |
|---|---|---|---|---|---|
| Box No. | X-2 | X-2 | | | |
| Time | 1100 | 1130 | | | |
| Temp. in Gas Meter | 87 | 88 | | | |
| Press. in Gas Meter | 0 | 0 | | | |
| Meter Reading | 0 | 2.200 | | | |
| Barom. Press. | 30.16 | 30.16 | | | |
| Percent Oxygen | | | | | |
| $N_2$ Purge Time | 1135 | 1155 | | | |

Calculation: $SO_3$ or $SO_2$, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess $O_2$ ________%

| | $SO_2$ | $SO_3$ | $SO_x$ |
|---|---|---|---|
| A = Ml of lead perchlorate used for sample = | 15.0 | 5.8 | |
| B = Ml of lead perchlorate used for bland = | 4.1 | 4.1 | |
| N = Normality of lead perchlorate titrant = | .01079 | .01079 | |
| F = Dilution factor = | 10 | 1 | |
| T = Average temp. in gas meter = | 548 | 548 | |
| V = Volume of gas sample $ft^3$ = | 2.200 | 2.200 | |
| P = Barometric pressure = | 30.16 | 30.16 | |
| p = Pressure in gas meter = | 0 | 0 | |
| Concentration, C, ppm = | 297 | 3.6 | |
| ,gm/dscm = | | | |
| Emission ,E, g/Mcal = | | | |
| lb/MBtu = | | | |
| ng/J = | | | |

$E = CF\left[\frac{2090}{20.9 - \%O_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = ___________ dscm/$10^4$ cal

___________ dscf/$10^4$ Btu

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**K V B. INC.**

Test No. 19-97

## SOx DATA SHEET

TEST NO. 19-97 UNIT NO. ____ FUEL #6 OIL LOAD 13.8 klb/hr ____ Location ______

| | | | | | |
|---|---|---|---|---|---|
| Box No. | X-1 | X-1 | | | |
| Time | 1135 | 1136 | | | |
| Temp. in Gas Meter | 89 | 90 | | | |
| Press. in Gas Meter | 0 | 0 | | | |
| Meter Reading | 0 | 2.700 | | | |
| Barom. Press. | 30.16 | 30.16 | | | |
| Percent Oxygen | | | | | |
| $N_2$ Purge Time | 1157 | | | | |

Calculation: $SO_3$ or $SO_2$, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess $O_2$ _______ %

| | $SO_2$ | $SO_3$ | $SO_x$ |
|---|---|---|---|
| A = Ml of lead perchlorate used for sample = | 23.1 | 6.0 | |
| B = Ml of lead perchlorate used for bland = | 4.1 | 4.1 | |
| N = Normality of lead perchlorate titrant = | .01079 | .01079 | |
| F = Dilution factor = | 10 | 1 | |
| T = Average temp. in gas meter = | 550 | 550 | |
| V = Volume of gas sample ft³ = | 2.700 | 2.700 | |
| P = Barometric pressure = | 30.16 | 30.16 | |
| p = Pressure in gas meter = | 0 | 0 | |
| Concentration,C, ppm = | 332 | 3.3 | |
| ,gm/dscm = | | | |
| Emission ,E, g/Mcal = | | | |
| lb/MBtu = | | | |
| ng/J = | | | |

$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = ___________ dscm/$10^4$ cal

___________ dscf/$10^4$ Btu

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**K V B. INC.**

Test No. 19-116

SOx DATA SHEET

TEST NO. 19-116 UNIT NO._____ FUEL #2 oil LOAD 14.5 klb/hr_____ Location 19

| | | | | | |
|---|---|---|---|---|---|
| Box No. | 2 | 2 | | | |
| Time | 0957 | 1020 | | | |
| Temp. in Gas Meter | 77 | 77 | | | |
| Press. in Gas Meter | 0 | 0 | | | |
| Meter Reading | 0 | 3.000 | | | |
| Barom. Press. | 29.72 | 29.72 | | | |
| Percent Oxygen | | | | | |
| $N_2$ Purge Time | 1025 | 1045 | | | |

Calculation: $SO_3$ or $SO_2$, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V (P + p)}$

Excess $O_2$ ________%

| | | $SO_2$ | $SO_3$ | $SO_x$ |
|---|---|---|---|---|
| A = Ml of lead perchlorate used for sample | = | 8.2 | 3.7 | |
| B = Ml of lead perchlorate used for bland | = | 2.6 | 2.6 | |
| N = Normality of lead perchlorate titrant | = | .01079 | .01079 | |
| F = Dilution factor | = | 10 | 1 | |
| T = Average temp. in gas meter | = | 537 | 537 | |
| V = Volume of gas sample $ft^3$ | = | 3.000 | 3.000 | |
| P = Barometric pressure | = | 29.72 | 29.72 | |
| p = Pressure in gas meter | = | 0 | 0 | |
| Concentration, C, ppm | = | 87 | 1.7 | |
| , gm/dscm | = | | | |
| Emission, E, g/Mcal | = | | | |
| lb/MBtu | = | | | |
| ng/J | = | | | |

$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = ___________dscm/$10^4$ cal

___________dscf/$10^4$ Btu

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KVB INC.

Test No. 19-116

## SOx DATA SHEET

TEST NO. 19-116 UNIT NO. _____ FUEL #2 OIL LOAD 14.5 klb/hr _____ Location 19

| | | | | | |
|---|---|---|---|---|---|
| Box No. | 1 | 1 | | | |
| Time | 1025 | 1055 | | | |
| Temp. in Gas Meter | 78 | 80 | | | |
| Press. in Gas Meter | 0 | 0 | | | |
| Meter Reading | 0 | 3.000 | | | |
| Barom. Press. | 29.72 | 29.72 | | | |
| Percent Oxygen | | | | | |
| $N_2$ Purge Time | 1100 | 1120 | | | |

Calculation: $SO_3$ or $SO_2$, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V (P + p)}$

Excess $O_2$ _______%

| | $SO_2$ | $SO_3$ | $SO_x$ |
|---|---|---|---|
| A = Ml of lead perchlorate used for sample = | 8.0 | 3.4 | |
| B = Ml of lead perchlorate used for bland = | 2.6 | 2.6 | |
| N = Normality of lead perchlorate titrant = | .01079 | .01079 | |
| F = Dilution factor = | 10 | 1 | |
| T = Average temp. in gas meter = | 539 | 539 | |
| V = Volume of gas sample $ft^3$ = | 3.000 | 3.000 | |
| P = Barometric pressure = | 29.72 | 29.72 | |
| p = Pressure in gas meter = | 0 | 0 | |
| Concentration, C, ppm = | 84 | 1.25 | |
| , gm/dscm = | | | |
| Emission, E, g/Mcal = | | | |
| lb/MBtu = | | | |
| ng/J = | | | |

$E = CF\left[\frac{2090}{20.9 - \%O_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = ___________ dscm/$10^4$ cal

___________ dscf/$10^4$ Btu

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K V B. INC.

Test No. 19-116

## SOx DATA SHEET

TEST NO. 19-116 UNIT NO. ____ FUEL #2 OIL LOAD 14.5 klb/hr ____ Location 19

| | | | | | |
|---|---|---|---|---|---|
| Box No. | 1 | 1 | | | |
| Time | 1057 | 1125 | | | |
| Temp. in Gas Meter | 81 | 93 | | | |
| Press. in Gas Meter | 0 | 0 | | | |
| Meter Reading | 0 | 2.017 | | | |
| Barom. Press. | 29.72 | 29.72 | | | |
| Percent Oxygen | | | | | |
| $N_2$ Purge Time | 1125 | 1145 | | | |

Calculation: $SO_3$ or $SO_2$, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V (P + p)}$

Excess $O_2$ ________%

| | | $SO_2$ | $SO_3$ | $SO_x$ |
|---|---|---|---|---|
| A = Ml of lead perchlorate used for sample | = | 5.5 | 2.8 | |
| B = Ml of lead perchlorate used for bland | = | 2.6 | 2.6 | |
| N = Normality of lead perchlorate titrant | = | .01079 | .01079 | |
| F = Dilution factor | = | 10 | 1 | |
| T = Average temp. in gas meter | = | 546 | 546 | |
| V = Volume of gas sample $ft^3$ | = | 2.017 | 2.017 | |
| P = Barometric pressure | = | 29.72 | 29.72 | |
| p = Pressure in gas meter | = | 0 | 0 | |
| Concentration, C, ppm | = | 50 | .47 | |
| , gm/dscm | = | | | |
| Emission, E, g/Mcal | = | | | |
| lb/MBtu | = | | | |
| ng/J | = | | | |

$E = CF \left[ \frac{2090}{20.9 - \%O_2} \right]$

where

C = pollutant concentration, g/dscm

F, volume factor = __________ dscm/$10^4$ cal

__________ dscf/$10^4$ Btu

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K V B. INC.

Test No. 19-132

## SOx DATA SHEET

TEST NO. 19-132 UNIT NO. _____ FUEL #6 LOAD 14.5 klb/hr _____ Location 19

| | | | | | |
|---|---|---|---|---|---|
| Box No. | Z-2 | Z-2 | | | |
| Time | 0938 | 0957 | | | |
| Temp. in Gas Meter | 68 | 72 | | | |
| Press. in Gas Meter | 0 | 0 | | | |
| Meter Reading | 0 | 1.0 | | | |
| Barom. Press. | 30.12 | 30.12 | | | |
| Percent Oxygen | .98 | .98 | | | |
| $N_2$ Purge Time | 1004 | 1029 | | | |

Calculation: $SO_3$ or $SO_2$, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess $O_2$ .98 %

| | | $SO_2$ | $SO_3$ | $SO_x$ |
|---|---|---|---|---|
| A = Ml of lead perchlorate used for sample | = | 11.76 | 3.4 | |
| B = Ml of lead perchlorate used for bland | = | 2.4 | 2.4 | |
| N = Normality of lead perchlorate titrant | = | .0107 | .0107 | |
| F = Dilution factor | = | 10 | 1 | |
| T = Average temp. in gas meter | = | 530 | 530 | |
| V = Volume of gas sample ft$^3$ | = | 1.0 | 1.0 | |
| P = Barometric pressure | = | 30.12 | 30.12 | |
| p = Pressure in gas meter | = | 0 | 0 | |
| Concentration, C, ppm | = | 423 | 4.5 | |
| ,gm/dscm | = | | | |
| Emission ,E, g/Mcal | = | | | |
| lb/MBtu | = | | | |
| ng/J | = | | | |

$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = __________ dscm/$10^4$ cal

__________ dscf/$10^4$ Btu

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K V B. INC.

Test No. 19-132

## SOx DATA SHEET

TEST NO. 19-132 UNIT NO. _____ FUEL #6 LOAD 14.5 klb/hr _____ Location 19

| | | | | | |
|---|---|---|---|---|---|
| Box No. | Z-1 | Z-1 | | | |
| Time | 1011 | 1026 | | | |
| Temp. in Gas Meter | 78 | 82 | | | |
| Press. in Gas Meter | 0 | 0 | | | |
| Meter Reading | 0 | 1.0 | | | |
| Barom. Press. | 30.12 | 30.12 | | | |
| Percent Oxygen | .95 | .95 | | | |
| $N_2$ Purge Time | 1032 | 1113 | | | |

Calculation: $SO_3$ or $SO_2$, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess $O_2$ .95 %

| | $SO_2$ | $SO_3$ | $SO_x$ |
|---|---|---|---|
| A = Ml of lead perchlorate used for sample = | 11.8 | 3.4 | |
| B = Ml of lead perchlorate used for bland = | 2.4 | 2.4 | |
| N = Normality of lead perchlorate titrant = | .0107 | .0107 | |
| F = Dilution factor = | 10 | 1 | |
| T = Average temp. in gas meter = | 540 | 540 | |
| V = Volume of gas sample ft$^3$ = | 1.0 | 1.0 | |
| P = Barometric pressure = | 30.12 | 30.12 | |
| p = Pressure in gas meter = | 0 | 0 | |
| Concentration, C, ppm = | 434 | 4.6 | |
| , gm/dscm = | | | |
| Emission , E, g/Mcal = | | | |
| lb/MBtu = | | | |
| ng/J = | | | |

$E = CF\left[\frac{2090}{20.9-\%O_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = __________ dscm/$10^4$ cal

__________ dscf/$10^4$ Btu

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K V B. INC.

Test No. 19-132

## SOx DATA SHEET

TEST NO. 19-132 UNIT NO. ____ FUEL #6 LOAD 14.5 klb/hr ____ Location 19

| | | | | | |
|---|---|---|---|---|---|
| Box No. | Z-2 | Z-2 | | | |
| Time | 1043 | 1104 | | | |
| Temp. in Gas Meter | 82 | 83 | | | |
| Press. in Gas Meter | 0 | 0 | | | |
| Meter Reading | 0 | 1.0 | | | |
| Barom. Press. | 30.12 | 30.12 | | | |
| Percent Oxygen | .95 | .95 | | | |
| $N_2$ Purge Time | 1115 | 1142 | | | |

Calculation: $SO_3$ or $SO_2$, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess $O_2$ .95

| | | $SO_2$ | $SO_3$ | $SO_x$ |
|---|---|---|---|---|
| A = Ml of lead perchlorate used for sample | = | 13.0 | 3.7 | |
| B = Ml of lead perchlorate used for bland | = | 2.4 | 2.4 | |
| N = Normality of lead perchlorate titrant | = | .0107 | .0107 | |
| F = Dilution factor | = | 10 | 1 | |
| T = Average temp. in gas meter | = | 542 | 542 | |
| V = Volume of gas sample $ft^3$ | = | 1.0 | 1.0 | |
| P = Barometric pressure | = | 30.12 | 30.12 | |
| p = Pressure in gas meter | = | 0 | 0 | |
| Concentration, C, ppm | = | 489 | 6 | |
| , gm/dscm | = | | | |
| Emission, E, g/Mcal | = | | | |
| lb/MBtu | = | | | |
| ng/J | = | | | |

$E = CF\left[\frac{2090}{20.9 - \%O_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = ________ dscm/$10^4$ cal

________ dscf/$10^4$ Btu

from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

Date 2-21-77

K V B. INC.

Test No. 19-143

## SOx DATA SHEET

TEST NO. 19-143 UNIT NO. ____ FUEL #6 LOAD 13.6 klb/hr ____ Location 19

| | | | | | |
|---|---|---|---|---|---|
| Box No. | Z-2 | Z-2 | | | |
| Time | 1017 | 1034 | | | |
| Temp. in Gas Meter | 80 | 80 | | | |
| Press. in Gas Meter | 0 | 0 | | | |
| Meter Reading | 0 | 1.0 | | | |
| Barom. Press. | 29.81 | 29.81 | | | |
| Percent Oxygen | 3.1 | 3.1 | | | |
| $N_2$ Purge Time | 1037 | 1106 | | | |

Calculation: $SO_3$ or $SO_2$, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V (P + p)}$

Excess $O_2$ 3.1 %

| | | $SO_2$ | $SO_3$ | $SO_x$ |
|---|---|---|---|---|
| A = Ml of lead perchlorate used for sample | = | 11.9 | 5.4 | |
| B = Ml of lead perchlorate used for bland | = | 4.5 | 45 | |
| N = Normality of lead perchlorate titrant | = | .0107 | .0107 | |
| F = Dilution factor | = | 10 | 1 | |
| T = Average temp. in gas meter | = | 540 | 540 | |
| V = Volume of gas sample ft$^3$ | = | 1.0 | 1.0 | |
| P = Barometric pressure | = | 29.81 | 29.81 | |
| p = Pressure in gas meter | = | 0 | 0 | |
| Concentration, C, ppm | = | 344 | 4.2 | |
| ,gm/dscm | = | | | |
| Emission ,E, g/Mcal | = | | | |
| lb/MBtu | = | | | |
| ng/J | = | | | |

$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = __________ dscm/$10^4$ cal

__________ dscf/$10^4$ Btu

from Fed. Reg. 9/11/74 p 32856

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rev. 1/2/75

Date 2-21-77

K V B. INC.

Test No. 19-143

SOx DATA SHEET

TEST NO. 19-143 UNIT NO. ____ FUEL #6 LOAD 13.6 klb/hr ____ Location 19

| | | | | | |
|---|---|---|---|---|---|
| Box No. | Z-1 | Z-1 | | | |
| Time | 1045 | 1104 | | | |
| Temp. in Gas Meter | 80 | 81 | | | |
| Press. in Gas Meter | 0 | 0 | | | |
| Meter Reading | 0 | 1.0 | | | |
| Barom. Press. | 29.81 | 29.81 | | | |
| Percent Oxygen | 3.1 | 3.1 | | | |
| $N_2$ Purge Time | | | | | |

Calculation: $SO_3$ or $SO_2$, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V (P + p)}$

Excess $O_2$ 3.1 %

| | $SO_2$ | $SO_3$ | $SO_x$ |
|---|---|---|---|
| A = Ml of lead perchlorate used for sample = | 12.0 | 5.1 | |
| B = Ml of lead perchlorate used for bland = | 4.5 | 4.5 | |
| N = Normality of lead perchlorate titrant = | .0107 | .0107 | |
| F = Dilution factor = | 10 | 1 | |
| T = Average temp. in gas meter = | 540 | 540 | |
| V = Volume of gas sample $ft^3$ = | 1.0 | 1.0 | |
| P = Barometric pressure = | 29.81 | 29.81 | |
| p = Pressure in gas meter = | 0 | 0 | |
| Concentration, C, ppm = | 348 | 2.7 | |
| , gm/dscm = | | | |
| Emission, E, g/Mcal = | | | |
| lb/MBtu = | | | |
| ng/J = | | | |

$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = ____________ dscm/$10^4$ cal

____________ dscf/$10^4$ Btu

from Fed. Reg. 9/11/74 p 32856

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K V B. INC.

Test No. 19-143

## SOx DATA SHEET

TEST NO. 19-143 UNIT NO. _____ FUEL #6 LOAD 13.6 klb/hr ____ Location 19

| | | | | | |
|---|---|---|---|---|---|
| Box No. | Z-2 | Z-2 | | | |
| Time | 1119 | 1141 | | | |
| Temp. in Gas Meter | 84 | 90 | | | |
| Press. in Gas Meter | 0 | 0 | | | |
| Meter Reading | 0 | 1.0 | | | |
| Barom. Press. | 29.81 | 29.81 | | | |
| Percent Oxygen | 3.1 | 3.1 | | | |
| $N_2$ Purge Time | 1146 | 1215 | | | |

Calculation: $SO_3$ or $SO_2$, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V (P + p)}$

Excess $O_2$ 3.1 %

| | | $SO_2$ | $SO_3$ | $SO_x$ |
|---|---|---|---|---|
| A = Ml of lead perchlorate used for sample | = | 12.6 | 5.6 | |
| B = Ml of lead perchlorate used for bland | = | 4.5 | 4.5 | |
| N = Normality of lead perchlorate titrant | = | .0107 | .0107 | |
| F = Dilution factor | = | 10 | 1 | |
| T = Average temp. in gas meter | = | 547 | 547 | |
| V = Volume of gas sample $ft^3$ | = | 1.0 | 1.0 | |
| P = Barometric pressure | = | 29.81 | 29.81 | |
| p = Pressure in gas meter | = | 0 | 0 | |
| Concentration, C, ppm | = | 381 | 5.2 | |
| , gm/dscm | = | | | |
| Emission, E, g/Mcal | = | | | |
| lb/MBtu | = | | | |
| ng/J | = | | | |

$E = CF\left[\frac{2090}{20.9-xO_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = __________ dscm/$10^4$ cal

__________ dscf/$10^4$ Btu

from Fed. Reg. 9/11/74 p 32856

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rev. 1/2/75

Date 2-23-77

K V B. INC.

Test No. 19-159

## SOx DATA SHEET

TEST NO. 19-159 UNIT NO. ____ FUEL #6 LOAD 14.0 klb/hr ____ Location 19

| | | | | | |
|---|---|---|---|---|---|
| Box No. | X-1 | X-1 | | | |
| Time | 0942 | 0959 | | | |
| Temp. in Gas Meter | 108 | 109 | | | |
| Press. in Gas Meter | 0 | 0 | | | |
| Meter Reading | 0 | 1.0 | | | |
| Barom. Press. | 30.08 | 30.08 | | | |
| Percent Oxygen | 1.75 | 1.75 | | | |
| $N_2$ Purge Time | 1005 | 1033 | | | |

Calculation: $SO_3$ or $SO_2$, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess $O_2$ 1.75 %

| | | $SO_2$ | $SO_3$ | $SO_x$ |
|---|---|---|---|---|
| A = Ml of lead perchlorate used for sample | = | 14.0 | 7.4 | |
| B = Ml of lead perchlorate used for bland | = | 6.7 | 6.7 | |
| N = Normality of lead perchlorate titrant | = | .0107 | .0107 | |
| F = Dilution factor | = | 10 | 1 | |
| T = Average temp. in gas meter | = | 568 | 568 | |
| V = Volume of gas sample $ft^3$ | = | 1.0 | 1.0 | |
| P = Barometric pressure | = | 30.08 | 30.08 | |
| p = Pressure in gas meter | = | 0 | 0 | |
| Concentration,C, ppm | = | 354 | 3.3 | |
| ,gm/dscm | = | | | |
| Emission ,E, g/Mcal | = | | | |
| lb/MBtu | = | | | |
| ng/J | = | | | |

$E = CF\left[\frac{2090}{20.9 - \%O_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = ____________ dscm/$10^4$ cal

____________ dscf/$10^4$ Btu

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K V B. INC.

Test No. 19-159

SOx DATA SHEET

TEST NO. 19-159 UNIT NO.____ FUEL #6 LOAD 14.0 klb/hr ____ Location 19

| | | | | | |
|---|---|---|---|---|---|
| Box No. | X-2 | X-2 | | | |
| Time | 1012 | 1030 | | | |
| Temp. in Gas Meter | 109 | 109 | | | |
| Press. in Gas Meter | 0 | 0 | | | |
| Meter Reading | 0 | 1.0 | | | |
| Barom. Press. | 30.08 | 30.08 | | | |
| Percent Oxygen | 1.7 | 1.7 | | | |
| $N_2$ Purge Time | 1035 | 1105 | | | |

Calculation: $SO_3$ or $SO_2$, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess $O_2$ 1.7 %

| | $SO_2$ | $SO_3$ | $SO_x$ |
|---|---|---|---|
| A = Ml of lead perchlorate used for sample = | 14.4 | 7.2 | |
| B = Ml of lead perchlorate used for bland = | 6.7 | 6.7 | |
| N = Normality of lead perchlorate titrant = | .0107 | .0107 | |
| F = Dilution factor = | 10 | 1 | |
| T = Average temp. in gas meter = | 569 | 569 | |
| V = Volume of gas sample $ft^3$ = | 1.0 | 1.0 | |
| P = Barometric pressure = | 30.08 | 30.08 | |
| p = Pressure in gas meter = | 0 | 0 | |
| Concentration,C, ppm = | 374 | 2.4 | |
| ,gm/dscm = | | | |
| Emission ,E, g/Mcal = | | | |
| lb/MBtu = | | | |
| ng/J = | | | |

$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = ________ dscm/$10^4$ cal

________ dscf/$10^4$ Btu

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Date 2-23-74

K V B. INC.

Test No. 19-159

## SOx DATA SHEET

TEST NO. 19-159 UNIT NO. ____ FUEL #6 LOAD 14.0 klb/hr ___ Location 19

| | | | | | |
|---|---|---|---|---|---|
| Box No. | Z-1 | Z-1 | | | |
| Time | 1044 | 1104 | | | |
| Temp. in Gas Meter | 110 | 110 | | | |
| Press. in Gas Meter | 0 | 0 | | | |
| Meter Reading | 0 | 1.0 | | | |
| Barom. Press. | 30.08 | 30.08 | | | |
| Percent Oxygen | 1.7 | 1.7 | | | |
| $N_2$ Purge Time | 1107 | 1129 | | | |

Calculation: $SO_3$ or $SO_2$, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess $O_2$ 1.7 %

| | $SO_2$ | $SO_3$ | $SO_x$ |
|---|---|---|---|
| A = Ml of lead perchlorate used for sample = | 14.2 | 7.1 | |
| B = Ml of lead perchlorate used for bland = | 6.7 | 6.7 | |
| N = Normality of lead perchlorate titrant = | .0107 | .0107 | |
| F = Dilution factor = | 10 | 1 | |
| T = Average temp. in gas meter = | 570 | 570 | |
| V = Volume of gas sample $ft^3$ = | 1.0 | 1.0 | |
| P = Barometric pressure = | 30.08 | 30.08 | |
| p = Pressure in gas meter = | 0 | 0 | |
| Concentration, C, ppm = | 331 | 1.7 | |
| , gm/dscm = | | | |
| Emission , E, g/Mcal = | | | |
| lb/MBtu = | | | |
| ng/J = | | | |

$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = __________ dscm/$10^4$ cal

__________ dscf/$10^4$ Btu

from Fed. Reg. 9/11/74 p 32856

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rev. 1/2/75

Date 3-1-77

KVB, INC.

Test No. 19-170

## SOx DATA SHEET

TEST NO. 19-170 UNIT NO. ____ FUEL #6 LOAD 14.1 klb/hr ____ Location 19

| | | | | | |
|---|---|---|---|---|---|
| Box No. | 2 | 2 | | | |
| Time | 1103 | 1123 | | | |
| Temp. in Gas Meter | 105 | 109 | | | |
| Press. in Gas Meter | 0 | 0 | | | |
| Meter Reading | 0 | 1.00 | | | |
| Barom. Press. | 29.98 | 29.98 | | | |
| Percent Oxygen | 4.2 | 4.2 | | | |
| $N_2$ Purge Time | 1126 | 1156 | | | |

Calculation: $SO_3$ or $SO_2$, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V (P + p)}$

Excess $O_2$ 4.2 %

| | $SO_2$ | $SO_3$ | $SO_x$ |
|---|---|---|---|
| A = Ml of lead perchlorate used for sample = | 16.2 | 8.6 | |
| B = Ml of lead perchlorate used for bland = | 6.9 | 6.9 | |
| N = Normality of lead perchlorate titrant = | .0101 | .0101 | |
| F = Dilution factor = | 10 | 1 | |
| T = Average temp. in gas meter = | 567 | 567 | |
| V = Volume of gas sample $ft^3$ = | 1.0 | 1.0 | |
| P = Barometric pressure = | 29.98 | 29.98 | |
| p = Pressure in gas meter = | 0 | 0 | |
| Concentration, C, ppm = | 426 | 7.8 | |
| , gm/dscm = | | | |
| Emission, E, g/Mcal = | | | |
| lb/MBtu = | | | |
| ng/J = | | | |

$E = CF\left[\frac{2090}{20.9 - \%O_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = __________ dscm/$10^4$ cal

__________ dscf/$10^4$ Btu

from Fed. Reg. 9/11/74 p 32856

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rev. 1/2/75

Date 3-1-77

K V B. INC.

Test No. 19-170

## SOx DATA SHEET

TEST NO. 19-170 UNIT NO. ____ FUEL #6 LOAD 14.1 klb/hr ____ Location 19

| | | | | | |
|---|---|---|---|---|---|
| Box No. | 1 | 1 | | | |
| Time | 1136 | 1155 | | | |
| Temp. in Gas Meter | 111 | 112 | | | |
| Press. in Gas Meter | 0 | 0 | | | |
| Meter Reading | 0 | 1.000 | | | |
| Barom. Press. | 29.98 | 29.98 | | | |
| Percent Oxygen | 4.2 | 4.2 | | | |
| $N_2$ Purge Time | 1202 | 1232 | | | |

Calculation: $SO_3$ or $SO_2$, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess $O_2$ 4.2 %

| | | $SO_2$ | $SO_3$ | $SO_x$ |
|---|---|---|---|---|
| A = Ml of lead perchlorate used for sample | = | 13.2 | 8.4 | |
| B = Ml of lead perchlorate used for bland | = | 6.9 | 6.9 | |
| N = Normality of lead perchlorate titrant | = | .0101 | .0101 | |
| F = Dilution factor | = | 10 | 1 | |
| T = Average temp. in gas meter | = | 571 | 571 | |
| V = Volume of gas sample $ft^3$ | = | 1.0 | 1.0 | |
| P = Barometric pressure | = | 29.98 | 29.98 | |
| p = Pressure in gas meter | = | 0 | 0 | |
| Concentration, C, ppm | = | 290 | 6.9 | |
| , gm/dscm | = | | | |
| Emission , E, g/Mcal | = | | | |
| lb/MBtu | = | | | |
| ng/J | = | | | |

$E = CF\left[\frac{2090}{20.9 - \%O_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = ____________ $dscm/10^4$ cal

____________ $dscf/10^4$ Btu

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Date 3-1-77

K V B. INC.

Test No. 19-170

## SOx DATA SHEET

TEST NO. 19-170 UNIT NO. ____ FUEL #6 LOAD 14.1 klb/hr ____ Location 19

| | | | | | |
|---|---|---|---|---|---|
| Box No. | 2 | 2 | | | |
| Time | 1211 | 1231 | | | |
| Temp. in Gas Meter | 113 | 116 | | | |
| Press. in Gas Meter | 0 | 0 | | | |
| Meter Reading | 0 | 1.000* | | | |
| Barom. Press. | 29.98 | 29.98 | | | |
| Percent Oxygen | 4.2 | 4.2 | | | |
| $N_2$ Purge Time | 1325 | 1325 | | | |

* METER STUCK ON THIS TEST

Calculation: $SO_3$ or $SO_2$, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess $O_2$ 4.2

| | | $SO_2$ | $SO_3$ | $SO_x$ |
|---|---|---|---|---|
| A = Ml of lead perchlorate used for sample | = | 12.7 | 7.0 | |
| B = Ml of lead perchlorate used for bland | = | 6.9 | 6.9 | |
| N = Normality of lead perchlorate titrant | = | .0101 | .0101 | |
| F = Dilution factor | = | 10 | 1 | |
| T = Average temp. in gas meter | = | 574 | 574 | |
| V = Volume of gas sample $ft^3$ | = | 1.00 | 1.00 | |
| P = Barometric pressure | = | 29.98 | 29.98 | |
| p = Pressure in gas meter | = | 0 | 0 | |
| Concentration, C, ppm | = | 269 | .4 | |
| , gm/dscm | = | | | |
| Emission, E, g/Mcal | = | | | |
| lb/MBtu | = | | | |
| ng/J | = | | | |

$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = __________ dscm/$10^4$ cal

__________ dscf/$10^4$ Btu

DO NOT USE THIS TEST IN AVE.

from Fed. Reg. 9/11/74 p 32856

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Date 2-3-77

K V B. INC.

Test No. 19-179

## SOx DATA SHEET

TEST NO. 19-179 UNIT NO.____ FUEL #2 Oil LOAD_____klb/hr____ Location 19

| | | | | | |
|---|---|---|---|---|---|
| Box No. | X-1 | X-1 | | | |
| Time | 1032 | 1050 | | | |
| Temp. in Gas Meter | 90 | 98 | | | |
| Press. in Gas Meter | 0 | 0 | | | |
| Meter Reading | 0 | 1.000 | | | |
| Barom. Press. | 30.34 | 30.34 | | | |
| Percent Oxygen | 3.6 | 3.6 | | | |
| $N_2$ Purge Time | 1052 | 1122 | | | |

Calculation: $SO_3$ or $SO_2$, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess $O_2$ 3.6

| | | $SO_2$ | $SO_3$ | $SO_x$ |
|---|---|---|---|---|
| A = Ml of lead perchlorate used for sample | = | 8.4 | 6.4 | |
| B = Ml of lead perchlorate used for bland | = | 6.2 | 6.2 | |
| N = Normality of lead perchlorate titrant | = | .0101 | .0101 | |
| F = Dilution factor | = | 10 | 1 | |
| T = Average temp. in gas meter | = | 554 | 554 | |
| V = Volume of gas sample $ft^3$ | = | 1.0 | 1.0 | |
| P = Barometric pressure | = | 30.34 | 30.34 | |
| p = Pressure in gas meter | = | 0 | 0 | |
| Concentration, C, ppm | = | 97 | 8.8 | |
| , gm/dscm | = | | | |
| Emission, E, g/Mcal | = | | | |
| lb/MBtu | = | | | |
| ng/J | = | | | |

$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = __________dscm/$10^4$ cal

__________dscf/$10^4$ Btu

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Date 3-3-77 K V B. INC. Test No. 19-179

## SOx DATA SHEET

TEST NO. 19-179 UNIT NO. ____ FUEL #2 oil LOAD ______ klb/hr ____ Location 19

| | | | | | |
|---|---|---|---|---|---|
| Box No. | X-2 | X-2 | | | |
| Time | 1102 | 1120 | | | |
| Temp. in Gas Meter | 99 | 100 | | | |
| Press. in Gas Meter | 0 | 0 | | | |
| Meter Reading | 0 | 1.000 | | | |
| Barom. Press. | 30.34 | 30.34 | | | |
| Percent Oxygen | 3.6 | 3.6 | | | |
| $N_2$ Purge Time | 1124 | 1153 | | | |

Calculation: $SO_3$ or $SO_2$, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess $O_2$ 3.6 %

| | | $SO_2$ | $SO_3$ | $SO_x$ |
|---|---|---|---|---|
| A = Ml of lead perchlorate used for sample | = | 8.4 | 6.4 | |
| B = Ml of lead perchlorate used for bland | = | 6.2 | 6.2 | |
| N = Normality of lead perchlorate titrant | = | .0101 | .0101 | |
| F = Dilution factor | = | 10 | 1 | |
| T = Average temp. in gas meter | = | 560 | 560 | |
| V = Volume of gas sample $ft^3$ | = | 1.0 | 1.0 | |
| P = Barometric pressure | = | 30.34 | 30.34 | |
| p = Pressure in gas meter | = | 0 | 0 | |
| Concentration, C, ppm | = | 98 | 8.9 | |
| , gm/dscm | = | | | |
| Emission, E, g/Mcal | = | | | |
| lb/MBtu | = | | | |
| ng/J | = | | | |

$E = CF\left[\frac{2090}{20.9-\%O_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = __________ $dscm/10^4$ cal

__________ $dscf/10^4$ Btu

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Date 3-3-77

K V B. INC.

Test No. 19-179

## SOx DATA SHEET

TEST NO. 19-179 UNIT NO. ____ FUEL #2 OIL LOAD ____ klb/hr ____ Location 19

| | | | | | |
|---|---|---|---|---|---|
| Box No. | X-1 | X-1 | | | |
| Time | 1139 | 1150 | | | |
| Temp. in Gas Meter | 100 | 100 | | | |
| Press. in Gas Meter | 0 | 0 | | | |
| Meter Reading | 0 | 1.0 | | | |
| Barom. Press. | 30.34 | 30.34 | | | |
| Percent Oxygen | 3.5 | 3.5 | | | |
| $N_2$ Purge Time | 1156 | 1315 | | | |

Calculation: $SO_3$ or $SO_2$, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V (P + p)}$

Excess $O_2$ 3.5

| | | $SO_2$ | $SO_3$ | $SO_x$ |
|---|---|---|---|---|
| A = Ml of lead perchlorate used for sample | = | 8.5 | 6.4 | |
| B = Ml of lead perchlorate used for bland | = | 6.2 | 6.2 | |
| N = Normality of lead perchlorate titrant | = | .0101 | .0101 | |
| F = Dilution factor | = | 10 | 1 | |
| T = Average temp. in gas meter | = | 560 | 560 | |
| V = Volume of gas sample $ft^3$ | = | 1.0 | 1.0 | |
| P = Barometric pressure | = | 30.34 | 30.34 | |
| p = Pressure in gas meter | = | 0 | 0 | |
| Concentration, C, ppm | = | 102 | 8.9 | |
| , gm/dscm | = | | | |
| Emission, E, g/Mcal | = | | | |
| lb/MBtu | = | | | |
| ng/J | = | | | |

$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = ____________ dscm/$10^4$ cal

____________ dscf/$10^4$ Btu

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rev. 1/2/75

Date 3-7-77

K V B. INC.

Test No. 19-190

SOx DATA SHEET

TEST NO. 19-190 UNIT NO. ____ FUEL NAT. GAS LOAD ______ klb/hr ____ Location 19

| | | | | | |
|---|---|---|---|---|---|
| Box No. | X-2 | X-2 | | | |
| Time | 0952 | 1009 | | | |
| Temp. in Gas Meter | 99 | 99 | | | |
| Press. in Gas Meter | 0 | 0 | | | |
| Meter Reading | 0 | 1.0 | | | |
| Barom. Press. | 30.07 | 30.07 | | | |
| Percent Oxygen | 3.2 | 3.2 | | | |
| $N_2$ Purge Time | 1015 | 1040 | | | |

Calculation: $SO_3$ or $SO_2$, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess $O_2$ 3.2

| | $SO_2$ | $SO_3$ | $SO_x$ |
|---|---|---|---|
| A = Ml of lead perchlorate used for sample = | 6.3 | 5.6 | |
| B = Ml of lead perchlorate used for bland = | 5.5 | 5.5 | |
| N = Normality of lead perchlorate titrant = | .0101 | .0101 | |
| F = Dilution factor = | 10 | 1 | |
| T = Average temp. in gas meter = | 559 | 559 | |
| V = Volume of gas sample $ft^3$ = | 1.0 | 1.0 | |
| P = Barometric pressure = | 30.07 | 30.07 | |
| p = Pressure in gas meter = | 0 | 0 | |
| Concentration,C, ppm = | 37 | .6 | |
| ,gm/dscm = | | | |
| Emission ,E, g/Mcal = | | | |
| lb/MBtu = | | | |
| ng/J = | | | |

$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = __________ dscm/$10^4$ cal

__________ dscf/$10^4$ Btu

from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

Date 3-7-77

K V B. INC.

Test No. 19-190

## SOx DATA SHEET

TEST NO. 19-190 UNIT NO.____ FUEL NAT. GAS LOAD_____klb/hr____ Location 17

| | | | | | |
|---|---|---|---|---|---|
| Box No. | Z-1 | Z-1 | | | |
| Time | 1021 | 1037 | | | |
| Temp. in Gas Meter | 99 | 100 | | | |
| Press. in Gas Meter | 0 | 0 | | | |
| Meter Reading | 0 | 1.00 | | | |
| Barom. Press. | 30.07 | 30.07 | | | |
| Percent Oxygen | 3.2 | 3.2 | | | |
| $N_2$ Purge Time | 1045 | 1115 | | | |

Calculation: $SO_3$ or $SO_2$, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess $O_2$ 3.2 %

| | $SO_2$ | $SO_3$ | $SO_x$ |
|---|---|---|---|
| A = Ml of lead perchlorate used for sample = | 6.9 | 6.0 | |
| B = Ml of lead perchlorate used for bland = | 5.5 | 5.5 | |
| N = Normality of lead perchlorate titrant = | .0101 | .0101 | |
| F = Dilution factor = | 10 | 1 | |
| T = Average temp. in gas meter = | 560 | 560 | |
| V = Volume of gas sample $ft^3$ = | 1.00 | 1.00 | |
| P = Barometric pressure = | 30.07 | 30.07 | |
| p = Pressure in gas meter = | 0 | 0 | |
| Concentration, C, ppm = | 66 | 2 | |
| , gm/dscm = | | | |
| Emission, E, g/Mcal = | | | |
| lb/MBtu = | | | |
| ng/J = | | | |

$$E = CF\left[\frac{2090}{20.9 - \%O_2}\right]$$

where

C = pollutant concentration, g/dscm

F, volume factor = __________ dscm/$10^4$ cal

__________ dscf/$10^4$ Btu

from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

Date 3-7-77

K V B. INC.

Test No. 19-190

## SOx DATA SHEET

TEST NO. 19-190 UNIT NO. ____ FUEL NAT. GAS LOAD ____ klb/hr ____ Location 19

| | | | | | |
|---|---|---|---|---|---|
| Box No. | X-2 | X-2 | | | |
| Time | 1055 | 1112 | | | |
| Temp. in Gas Meter | 102 | 102 | | | |
| Press. in Gas Meter | 0 | 0 | | | |
| Meter Reading | 0 | 1.00 | | | |
| Barom. Press. | 30.07 | 30.07 | | | |
| Percent Oxygen | 3.2 | 3.2 | | | |
| $N_2$ Purge Time | 1118 | 1140 | | | |

Calculation: $SO_3$ or $SO_2$, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess $O_2$ 3.2 %

| | | $SO_2$ | $SO_3$ | $SO_x$ |
|---|---|---|---|---|
| A = Ml of lead perchlorate used for sample | = | 6.3 | 5.8 | |
| B = Ml of lead perchlorate used for bland | = | 5.5 | 5.5 | |
| N = Normality of lead perchlorate titrant | = | .0101 | .0101 | |
| F = Dilution factor | = | 10 | 1 | |
| T = Average temp. in gas meter | = | 562 | 562 | |
| V = Volume of gas sample $ft^3$ | = | 1.00 | 1.00 | |
| P = Barometric pressure | = | 30.07 | 30.07 | |
| p = Pressure in gas meter | = | 0 | 0 | |
| Concentration,C, ppm | = | 38 | 1.5 | |
| ,μm/dscm | = | | | |
| Emission ,E, g/Mcal | = | | | |
| lb/MBtu | = | | | |
| ng/J | = | | | |

$E = CF\left[\frac{2090}{20.9 - \%O_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = ____________ dscm/$10^4$ cal

____________ dscf/$10^4$ Btu

from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

Date 3-7-77

K V B. INC.

Test No. 19- 192

## SOx DATA SHEET

TEST NO. 19-192 UNIT NO. ____ FUEL #6 LOAD ____ klb/hr ____ Location ____

| | | | | | |
|---|---|---|---|---|---|
| Box No. | Z-1 | Z-1 | | | |
| Time | 1522 | 1540 | | | |
| Temp. in Gas Meter | 101 | 103 | | | |
| Press. in Gas Meter | 0 | 0 | | | |
| Meter Reading | 0 | 1.000 | | | |
| Barom. Press. | 30.07 | 30.07 | | | |
| Percent Oxygen | 4.2 | 4.2 | | | |
| $N_2$ Purge Time | 1546 | 1611 | | | |

Calculation: $SO_3$ or $SO_2$, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess $O_2$ 4.2 %

| | | $SO_2$ | $SO_3$ | $SO_x$ |
|---|---|---|---|---|
| A = Ml of lead perchlorate used for sample | = | 12.6 | 5.8 | |
| B = Ml of lead perchlorate used for bland | = | 5.6 | 5.6 | |
| N = Normality of lead perchlorate titrant | = | .0101 | .0101 | |
| F = Dilution factor | = | 10 | 1 | |
| T = Average temp. in gas meter | = | 562 | 562 | |
| V = Volume of gas sample $ft^3$ | = | 1.000 | 1.000 | |
| P = Barometric pressure | = | 30.07 | 30.07 | |
| p = Pressure in gas meter | = | 0 | 0 | |
| Concentration, C, ppm | = | 317 | 9 | |
| , gm/dscm | = | | | |
| Emission, E, g/Mcal | = | | | |
| lb/MBtu | = | | | |
| ng/J | = | | | |

$E = CF\left[\frac{2090}{20.9-\%O_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = ____ dscm/$10^4$ cal

____ dscf/$10^4$ Btu

from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

Date 3-7-77

K V B. INC.

Test No. 19-192

## SOx DATA SHEET

TEST NO. 19-192 UNIT NO. ____ FUEL #6 LOAD ____ klb/hr ____ Location 19

| | | | | | |
|---|---|---|---|---|---|
| Box No. | X-2 | X-2 | | | |
| Time | 1552 | 1609 | | | |
| Temp. in Gas Meter | 104 | 104 | | | |
| Press. in Gas Meter | 0 | 0 | | | |
| Meter Reading | 0 | 1.00 | | | |
| Barom. Press. | 30.07 | 30.07 | | | |
| Percent Oxygen | 4.1 | 4.1 | | | |
| $N_2$ Purge Time | 1613 | 1641 | | | |

Calculation: $SO_3$ or $SO_2$, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V (P + p)}$

Excess $O_2$ 4.1

| | | $SO_2$ | $SO_3$ | $SO_x$ |
|---|---|---|---|---|
| A = Ml of lead perchlorate used for sample | = | 12.1 | 5.1 | |
| B = Ml of lead perchlorate used for bland | = | 5.6 | 5.6 | |
| N = Normality of lead perchlorate titrant | = | .0101 | .0101 | |
| F = Dilution factor | = | 10 | 1 | |
| T = Average temp. in gas meter | = | 564 | 564 | |
| V = Volume of gas sample $ft^3$ | = | 1.00 | 1.00 | |
| P = Barometric pressure | = | 30.07 | 30.07 | |
| p = Pressure in gas meter | = | 0 | 0 | |
| Concentration,C, ppm | = | 296 | 0 | |
| ,gm/dscm | = | | | |
| Emission ,E, g/Mcal | = | | | |
| lb/MBtu | = | | | |
| ng/J | = | | | |

$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$

where

C = pollutant concentration, g/dscm

F, volume factor = __________ dscm/$10^4$ cal

__________ dscf/$10^4$ Btu

from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

Date 3-7-77

K V B. INC.

Test No. 19-192

## SOx DATA SHEET

TEST NO:_____ UNIT NO._____ FUEL_____ LOAD______klb/hr____Location______

| | | | | | |
|---|---|---|---|---|---|
| Box No. | x-3 | x-3 | | | |
| Time | 1623 | 1639 | | | |
| Temp. in Gas Meter | 105 | 107 | | | |
| Press. in Gas Meter | 0 | 0 | | | |
| Meter Reading | 0 | 1.000 | | | |
| Barom. Press. | 30.07 | 30.07 | | | |
| Percent Oxygen | 4.1 | 4.1 | | | |
| $N_2$ Purge Time | 1643 | 1710 | | | |

Calculation: $SO_3$ or $SO_2$, ppm = $\frac{(A - B) \times N \times F \times (460 + T) \times 24}{V\ (P + p)}$

Excess $O_2$ 4.1

| | | $SO_2$ | $SO_3$ | $SO_x$ |
|---|---|---|---|---|
| A = Ml of lead perchlorate used for sample | = | 11.8 | 8.1 | |
| B = Ml of lead perchlorate used for bland | = | 5.6 | 5.6 | |
| N = Normality of lead perchlorate titrant | = | .0101 | .0101 | |
| F = Dilution factor | = | 10 | 1 | |
| T = Average temp. in gas meter | = | 566 | 566 | |
| V = Volume of gas sample $ft^3$ | = | 1.00 | 1.00 | |
| P = Barometric pressure | = | 30.07 | 30.07 | |
| p = Pressure in gas meter | = | 0 | 0 | |
| Concentration, C, ppm | = | 283 | 11 | |
| ,gm/dscm | = | | | |
| Emission ,E, g/Mcal | = | | | |
| lb/MBtu | = | | | |
| ng/J | = | | | |

$$E = CF\left[\frac{2090}{20.9 - xO_2}\right]$$

where

C = pollutant concentration, g/dscm

F, volume factor = __________dscm/$10^4$ cal

__________dscf/$10^4$ Btu

from Fed. Reg. 9/11/74 p 32856

60-14
rev. 1/2/75

# KVB

## SASS SAMPLING CONDITIONS

Test Site Location 19

Sample Port Location Stack Exit (Test 19-1 SASS)

Stack Conditions: Stack Velocity ______ ft/min ÷ 60 = $V_s$ = 24.9 ft/sec

Stack Temp. 513 °F + 460 = $T_s$ = 973 °R

Stack Moisture; $B_{wo}$ = 0.10 est.

Particulate Loading (Method 5), C = N.A. grams/$DSm^3$

**Probe Nozzle Size** for 4.0 ACFM (wet) through cyclones at 400 °F:

Isokinetic Size = $0.1192 \times \sqrt{T_s/V_s}$ = 0.745 inches

Closest Actual Nozzle Size, $D_n$ = 0.75 inches

% Isokinetic @ 4 WACFM, Actual Nozzle = $1.421 \times T_s/(V_s \times D_n^2)$ = 98.71 %

If % Iso not in range of 90 to 110%, Adjust Cyclone Flow by:

$Q_{cyc} = 2.814 \times (\%\ \mathrm{Iso}) \times V_s \times D_n^2/T_s$ = 4.0 wet ACFM (4.05 for 100%)

If % Iso @ 4 WACFM is greater than 110, use (% Iso) = 110
If % Iso @ 4 WACFM is less than 90, use (% Iso) = 90

**Orifice Pressure Differential**, H

Meter Temp., $T_m$ = 151 °F + 460 = 612 °R (use 560 °R for estimate)

Meter Flow Rate, $Q_m = Q_{cyc} \times T_m \times (1. - B_{wo})/860$ = 2.56 DCFM

Orifice No. (1, 2, 3) = 2, J = 0.78, $D_o$ = 0.281, $J \times D_o^2$ = 0.062

Orifice Press Diff., $H = 1.108 \times (Q_m/J\,D_o^2)^2/T_m$ = 2.82 in. $H_2O$

**Dry Gas Volume to be Collected** (5 hour run)

$V_m = Q_m \times 60 \times 5$ = 702 DCF (683.63)

**Estimated Condensate Collection**

$V_{1c} = V_m \times 530 \times B_{wo}/[0.0474 \times T_m \times (1. - B_{wo})]$ = 1557 ml (1208)

**Estimated Particulate Collection**

$M_n = C \times V_m \times 530/(T_m \times 35.3)$ = — grams 0.4289 by SASS

# KVB

## SASS SAMPLING CONDITIONS

Test Site Location 19

Sample Port Location Stack Exit (Test 19-2 SASS)

Stack Conditions: Stack Velocity ________ ft/min ÷ 60 = $V_s$ = 23.8 ft/sec

$\Delta p = 0.1$

$T_s = 515°F$

Stack Temp. 515 °F + 460 = $T_s$ = 975 °R

Stack Moisture; $B_{wo}$ = 0.090 est. (new oil)

Particulate Loading (Method 5), C = — grams/DSm$^3$

Probe Nozzle Size for 4.0 ACFM (wet) through cyclones at 400 °F:

Isokinetic Size = $0.1192 \times \sqrt{T_s/V_s}$ = 0.76 inches

Closest Actual Nozzle Size, $D_n$ = 0.75 inches

% Isokinetic @ 4 WACFM, Actual Nozzle = $1.421 \times T_s/(V_s \times D_n^2)$ = 103.5 %

If % Iso not in range of 90 to 110%, Adjust Cyclone Flow by:

$Q_{cyc} = 2.814 \times (\%\ \text{Iso}) \times V_s \times D_n^2/T_s$ = 4.0 wet ACFM

If % Iso @ 4 WACFM is greater than 110, use (% Iso) = 110
If % Iso @ 4 WACFM is less than 90, use (% Iso) = 90

Orifice Pressure Differential, H

Meter Temp., $T_m$ = 128 °F + 460 = 588 °R (use 560 °R for estimate)

Meter Flow Rate, $Q_m = Q_{cyc} \times T_m \times (1. - B_{wo})/860$ = 2.37 DCFM

Orifice No. (1, 2, 3) = 2, J = 0.78, $D_o$ = 0.281, $J \times D_o^2$ = 0.062

Orifice Press Diff., $H = 1.108 \times (Q_m/J\ D_o^2)^2/T_m$ = 2.89 in. $H_2O$

Dry Gas Volume to be Collected (5 hour run)

$V_m = Q_m \times 60 \times 5$ = 711 DCF (700)

Estimated Condensate Collection

$V_{1c} = V_m \times 530 \times B_{wo}/[0.0474 \times T_m \times (1. - B_{wo})]$ = 1404 ml (1222)

Estimated Particulate Collection

$M_n = C \times V_m \times 530/(T_m \times 35.3)$ = — grams 2.7416g

# KVB

## SASS SAMPLING CONDITIONS

Test Site Location 19

Sample Port Location Stack Exit 19-3 SASS

Stack Conditions: Stack Velocity ______ ft/min ÷ 60 = $V_s$ = 24.19 ft/sec

$\Delta p = 0.1$

$T_s$: 550°F

Stack Temp. 550 °F + 460 = $T_s$ = 1010 °R

Stack Moisture; $B_{wo}$ = 0.09

Particulate Loading (Method 5), C = — grams/$DSm^3$

**Probe Nozzle Size** for 4.0 ACFM (wet) through cyclones at 400 °F:

Isokinetic Size = $0.1192 \times \sqrt{T_s/V_s}$ = 0.77 inches

Closest Actual Nozzle Size, $D_n$ = 0.75 inches

% Isokinetic @ 4 WACFM, Actual Nozzle = $1.421 \times T_s/(V_s x D_n^2)$ = 105.5 %

If % Iso not in range of 90 to 110%, Adjust Cyclone Flow by:

$Q_{cyc} = 2.814 \times (\%\ \text{Iso}) \times V_s \times D_n^2/T_s$ = 4.0 wet ACFM

If % Iso @ 4 WACFM is greater than 110, use (% Iso) = 110
If % Iso @ 4 WACFM is less than 90, use (% Iso) = 90

**Orifice Pressure Differential**, H

Meter Temp., $T_m$ = 100 °F + 460 = 560 °R (use 560 °R for estimate)

Meter Flow Rate, $Q_m = Q_{cyc} \times T_m \times (1. - B_{wo})/860$ = 2.37 DCFM

Orifice No. (1, 2, 3) = 2, J = 0.78, $D_o$ = 0.281, $J \times D_o^2$ = 0.062

Orifice Press Diff., $H = 1.108 \times (Q_m/J\ D_o^2)^2/T_m$ = 2.89 in. $H_2O$ use 2.9

**Dry Gas Volume to be Collected** (5 hour run)

$V_m = Q_m \times 60 \times 5$ = 711 DCF

**Estimated Condensate Collection**

$V_{lc} = V_m \times 530 \times B_{wo}/[0.0474 \times T_m \times (1. - B_{wo})]$ = 1404 ml

**Estimated Particulate Collection**

$M_n = C \times V_m \times 530/(T_m \times 35.3)$ = — grams

## SASS SAMPLING CONDITIONS

Test Site Location 19 TEST 19-4 SASS

Sample Port Location STACK EXIT

Stack Conditions: Stack Velocity ______ ft/min ÷ 60 = $V_s$ = 22.11 (22.75) ft/sec

Δp 0.085

Stack Temp. 533 °F + 460 = $T_s$ = 993 °R

Δp CHANGED TO 0.09 DURING TEST) Stack Moisture; $B_{wo}$ = .09

Particulate Loading (Method 5), C = — grams/$DSm^3$

Probe Nozzle Size for 4.0 ACFM (wet) through cyclones at 400 °F:

Isokinetic Size = $0.1192 \times \sqrt{T_s/V_s}$ = .798 inches (.7875)

Closest Actual Nozzle Size, $D_n$ = .75 inches

% Isokinetic @ 4 WACFM, Actual Nozzle = $1.421 \times T_s/(V_s \times D_n^2)$ = 113.5 (110.2) %

If % Iso not in range of 90 to 110%, Adjust Cyclone Flow by:

$Q_{cyc} = 2.814 \times (\%\ \text{Iso}) \times V_s \times D_n^2/T_s$ = 3.88 wet ACFM (3.99)

If % Iso @ 4 WACFM is greater than 110, use (% Iso) = 110
If % Iso @ 4 WACFM is less than 90, use (% Iso) = 90

Orifice Pressure Differential, H

Meter Temp., $T_m$ = 100 °F + 460 = 560 °R (use 560 °R for estimate)

Meter Flow Rate, $Q_m = Q_{cyc} \times T_m \times (1. - B_{wo})/860$ = 2.299 DCFM (2.364)

Orifice No. (1, 2, 3) = 2, J = 0.78, $D_o$ = 0.281, $J \times D_o^2$ = 0.062

Orifice Press Diff., $H = 1.108 \times (Q_m/J\ D_o^2)^2/T_m$ = 2.72 (2.87) in. $H_2O$

Dry Gas Volume to be Collected (5 hour run)

$V_m = Q_m \times 60 \times 5$ = 689.7 DCF

Estimated Condensate Collection

$V_{lc} = V_m \times 530 \times B_{wo}/[0.0474 \times T_m \times (1. - B_{wo})]$ = 1361 ml

Estimated Particulate Collection

$M_n = C \times V_m \times 530/(T_m \times 35.3)$ = — grams

# KVB, INC. TRACE SPECIES AND ORGANICS SAMPLING DATA

Project: EPA
Personnel: R. PIONESSA<br>M. HAGERTY
Barometric Press: 30.17
Date: 3-10-77
Location: 19
Unit:
Probe Nozzle Diameter (inches): 0.750 (Dn)
Test: 19-1 SASS
Absolute Static Press. in Stack (in. ~~Hg~~ $H_2O$): -0.21 (Ps)
Fuel: #6 OIL
Pitot Tube Coefficient: 0.83 (Cp)

| TIME | | Traverse Point Depth | Pitot ΔP (in $H_2O$) | Orifice ΔP (in $H_2O$) | Cum. Meter Volume (ft$^3$) | Pump Suction (in. Hg) | TEMPERATURE (°F) | | | | | | | $O_2$ Conc. % dry |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Real | Elapsed | | | | | | Stack | Probe | XAD-2 | Impinger Out | Oven | Meter In | Meter Out | |
| 1115 | 0 | Center 15" in | 0.11 | 2.82 | 814.107 | 5.9 | 513 | 400? | 61 | 98 | 400 | 119 | 111 | |
| 1145 | 30 | | | | 882.000 | 6.2 | 511 | 395 | 64 | 86 | 394 | 141 | 124 | |
| 1215 | 60 | | | | 949.000 | 6.5 | 513 | 400 | 62 | 82 | 399 | 148 | 132 | |
| 1245 | 90 | | | | 016.000 | 7.0 | 512 | 400 | 62 | 80 | 401 | 155 | 139 | |
| 1315 | 120 | | ↓ | | 084.000 | | | OUT OF SERVICE | | | | | | |
| | | | | | CHANGED | | DESSICANT | | | | | | | |
| 1320 | 120 | | * 0.18/0.11 | | 084.000 | 7.0 | 513 I 005 | VERY HOT TO TOUCH | 62 | 112 | 406 | 153 | 143 | |
| 1350 | 150 | | 0.11 | | 156.000 | 7.0 | LOOSE CONNECTION | BROKEN T/C WIRE | 62 | 100 | 400 | 156 | 145 | |
| 1420 | 180 | | | | 224.000 | 7.5 | 508 | POSSIBLE SHORT IN | 64 | 88 | 401 | 158 | 147 | |
| 1450 | 210 | | | | 290.000 | 7.7 | 509 | HEATER LINES | 58 | 91 | 403 | 157 | 145 | |
| 1520 | 240 | | | | 364.000 | 8.0 | 510 | | 63 | 79 | 405 | 157 | 146 | |
| 1550 | 270 | | | | 430.000 | 8.0 | 510 | | 64 | 77 | 406 | 157 | 145 | |
| 1620 | 300 | ↓ | ↓ | ↓ | 497.700 | 8.5 | 510 | ↓ | 70 | 76 | 405 | 157 | 146 | |
| | | | | | | | | | | | | | | |
| * | NOW | USING JOY | PITOT | PROBE & | INCLINE | MANOM | ETER/ | POSSIBLE | HOLE IN | STATIC | (ACUTHERM) PROBE | DUE | TO | SHORT |
| | | | | | | | | | | | | | | |

KVB 6002-12

## KVB, INC. TRACE SPECIES AND ORGANICS SAMPLING DATA

Project: EPA PHASE III SASS
Date: 3-17-77
Location: 19
Unit:
Test: 19- 2-SASS
Fuel: #6 OIL

Personnel: R. PIDNESSA
M. HAGERTY

Barometric Press: 29.99 - 1000 HRS
29.92 - 1500 HRS

Probe Nozzle Diameter (inches): 3/4 (Dn)
Absolute Static Press. in Stack (in. Hg): -0.20 (Ps)
Pitot Tube Coefficient: 0.83 (Cp)

| TIME | | Traverse Point Depth | Pitot ΔP (in $H_2O$) | Orifice ΔP (in $H_2O$) | Cum. Meter Volume ($ft^3$) | Pump Suction (in. Hg) | TEMPERATURE (°F) | | | | | | | $O_2$ Conc. % dry |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Real | Elapsed | | | | | | Stack | Probe | XAD-2 | Impinger Out | Oven | Meter In/Out | | |
| 0955 | 0 | 15", IN | 0.10 | 2.9 | 500.532 | 7.2 | 515 | 387 | 61 | 67 | 401 | 97 | 92 | |
| 1025 | 30 | | | | 568.000 | 8.2 | 511 | 398 | 64 | 77 | 400 | 119 | 102 | |
| 1055 | 60 | | | | 639.000 | 9.0 | 512 | 399 | 61 | 80 | 402 | 126 | 109 | |
| 1125 | 90 | | | | 709.000 | 9.9 | 512 | 408 | 64 | 77 | 402 | 130 | 114 | |
| 1155 | 120 | | | | 779.000 | 10.9 | 514 | 409 | 65 | 78 | 402 | 132 | 118 | |
| 1225 | 150 | | | | 849.109 | 11.7 | 513 | 406 | 66 | 74 | 403 | 131 | 119 | |
| | | | | | | | | | | | | | | |
| 1227 | 150 | | | | 849.109 | 11.7 | 513 | 406 | 66 | 74 | 403 | 131 | 119 | |
| 1257 | 180 | | | | 921.000 | 13.0 | 516 | 409 | 65 | 87 | 403 | 132 | 119 | |
| 1327 | 210 | | | | 988.000 | 14.0 | 515 | 410 | 64 | 81 | 403 | 135 | 120 | |
| 1357 | 240 | | | | 058.000 | 15.0 | 512 | 404 | 62 | 81 | 403 | 136 | 122 | |
| 1427 | 270 | | | | 129.000 | 16.0 | 521 | 407 | 62 | 83 | 405 | 139 | 125 | |
| 1457 | 300 | | | | 199.167 | 16.5 | 510 | 402 | 64 | 79 | 404 | 145 | 130 | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |

# KVB, INC. TRACE SPECIES AND ORGANICS SAMPLING DATA

Project: EPA PHASE III SASS
Date: 3-21-77
Location: 19
Unit:
Test: LO $NO_x$ 19-3 SASS
Fuel: #6 OIL

Personnel: [illegible]
[illegible]

Barometric Press: 30.19 [illegible]

Probe Nozzle Diameter (inches): .75 (Dn)
Absolute Static Press. in Stack (in. ~~Hg~~ $H_2O$): -.22 (Ps)
Pitot Tube Coefficient: .83 (Cp)

| TIME | | Traverse Point Depth | Pitot ΔP (in $H_2O$) | Orifice ΔP (in $H_2O$) | Cum. Meter Volume (ft³) | Pump Suction (in. Hg) | TEMPERATURE (°F) | | | | | | | $O_2$ Conc. % dry |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Real | Elapsed | | | | | | Stack | Probe | XAD-2 | Impinger Out | Oven | Meter In | Meter Out | |
| 1030 | 0 | 15" in | .10 | 2.9 | 203.052 | 7.4 | 553 | 402 | 60 | 86 | 405 | 112 | 109 | |
| 1100 | 30 | " | .10 | 2.9 | 272.500 | 8.0 | 553 | 403 | 61 | 81 | 403 | 134 | 118 | |
| 1130 | 60 | " | .10 | 2.9 | 342.200 | 8.5 | 559 | 409 | 54 | 78 | 403 | 141 | 126 | |
| 1200 | 90 | " | .10 | 2.9 | 412.000 | 9.8 | 562 | 411 | 61 | 88 | 405 | 146 | 131 | |
| 1230 | 120 | " | .10 | 2.9 | 486.000 | 11.5 | 561 | 409 | 62 | 86 | 405 | 145 | 133 | |
| 1300 | 150 | " | .10 | 2.9 | 552.950 | 12.1 | 559 | 407 | 62 | 86 | 404 | 140 | 134 | |
| | | | | CHANGED DESSICANT | | | | | | | | | | |
| 1302 | 150 | 15" in | .10 | 2.9 | 552.950 | 12.5 | 559 | 404 | 60 | 107 | 406 | 146 | 135 | |
| 1332 | 180 | " | .10 | 2.9 | 624.400 | 13.1 | 554 | 406 | 57 | 108 | 407 | 150 | 138 | |
| 1402 | 210 | " | .10 | 2.9 | 691.400 | 13.9 | 564 | 406 | 70 | 102 | 405 | 133 | 129 | |
| 1432 | 240 | " | .10 | 2.9 | 765.300 | 15.0 | 557 | 407 | 66 | 98 | 404 | 133 | 122 | |
| 1502 | 270 | " | .10 | 2.9 | 835.100 | 16.0 | 544 | 408 | 61 | 95 | 407 | 146 | 130 | |
| 1532 | 300 | " | .10 | 2.9 | 905.500 | 16.6 | 545 | 409 | 66 | 95 | 404 | 149 | 135 | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |

KVB 6002-12

# KVB, Inc. Trace Specie' ND Organics Sampling Data

Project: EPA PHASE III
Personnel: PIONESSA [illegible]
Barometric Press: 29.83 1200 HRS
Date: 3-23-77
Location: 19
Unit:
Probe Nozzle Diameter (inches): .75 (Dn)
Test: 19-4 SASS
Absolute Static Press. in Stack (in. ~~Hg~~ $H_2O$): -.21 (Ps)
Fuel: #6 OIL
Pitot Tube Coefficient: .83 (Cp)

| TIME | | Traverse Point Depth | Pitot ΔP (in $H_2O$) | Orifice ΔP (in $H_2O$) | Cum. Meter Volume ($ft^3$) | Pump Suction (in. Hg) | TEMPERATURE (°F) | | | | | | | $O_2$ Conc. % dry |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Real | Elapsed | | | | | | Stack | Probe | XAD-2 | Impinger Out | Oven | Meter In | Out | |
| 0930 | 0 | 15" in | .10 | 2.9 | 907.074 | 7.5 | 524 | 402 | 54 | 67 | 395 | 100 | 94 | |
| 1000 | 30 | " | .085 | 2.72 | 978.000 | 8.0 | 532 | 400 | 59 | 78 | 398 | 124 | 106 | |
| 1030 | 60 | " | .09 | 2.87 | 046.200 | 8.2 | 532 | 397 | 59 | 74 | 399 | 129 | 113 | |
| 1100 | 90 | " | .09 | 2.87 | 114.500 | 9.2 | 533 | 400 | 61 | 75 | 400 | 131 | 117 | |
| 1130 | 120 | " | .09 | 2.87 | 186.000 | 10.0 | 533 | 402 | 60 | 74 | 399 | 132 | 119 | |
| 1200 | 150 | " | .09 | 2.87 | 255.930 | 10.9 | 540 | 401 | 59 | 89 | 401 | 136 | 122 | |
| | | | | CHANGED DESSICANT | | | | | | | | | | |
| 1202 | 150 | 15" in | .09 | 2.87 | 255.930 | 11.0 | 538 | 407 | 58 | 96 | 403 | 131 | 121 | |
| 1232 | 180 | " | .09 | 2.87 | 327.000 | 11.4 | 537 | 402 | 59 | 91 | 402 | 136 | 122 | |
| 1302 | 210 | " | .09 | 2.87 | 397.600 | 12.0 | 538 | 402 | 59 | 86 | 401 | 137 | 123 | |
| 1332 | 240 | " | .09 | 2.87 | 468.200 | 12.5 | 532 | 395 | 60 | 76 | 400 | 137 | 123 | |
| 1402 | 270 | " | .09 | 2.87 | 539.700 | 13.0 | 533 | 398 | 60 | 84 | 401 | 140 | 126 | |
| 1432 | 300 | " | .09 | 2.87 | 610.537 | 13.6 | 533 | 397 | 60 | 90 | 402 | 139 | 126 | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |

KVB 6002-12

T = 124 °F

## PARTICULATE EMISSION CALCULATIONS

Test No. 19-1 SASS Date 3-10-77 Location 19 Engr. HB

Unit No. ______ Fuel #6 OIL Sampling Train and Method SASS Train

Pitot Factor, Fs 0.83 Barometric Pressure, $P_{bar}$ 30.17 in. Hg

Tot. Liquid Collected, $V_{1c}$ 1208 (1) ml Total Particulate, $M_n$ 428.9 (2) m gm

Velocity Head, ΔP 0.11 iwg Stack Temp., Ts 971 °R Stack Area, As 4.90 $ft^2$

Sample Volume, Vm 683.6 $ft^3$ Stack Press., Psg -0.21 iwg Excess $O_2$, $XO_2$% 2.9 %

Orifice Press. Diff., H 2.82 iwg Stack Gas Sp. Gravity, Gs 1 n.d.

Sample Time, θ 300 min Nozzle Dia., Dn 0.75 in. Meter Temp., $T_m$ 604 °R

| | | | |
|---|---|---|---|
| *1. Sample Gas Volume | $Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$ | 693.6 | SCF |
| 2. Water Vapor | $Vw_{std} = 0.0474\ V_{1c}$ | 57.2 | SCF |
| 3. Moisture Content | Bwo = Eq. 2/(Eq. 1 + Eq. 2) | 0.076 | N.D. |
| 4. Concentration | a. $C = 0.0154\ Mn/Vm_{std}$ | 0.0095 | grains/DSCF |
| | b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$ | $1.36 \times 10^{-6}$ | lb/DSCF |
| | c. C = Eq. 4b x $16.018 \times 10^3$ | $2.18 \times 10^{-2}$ | grams/DSCM |
| 5. Abs. Stack Press. | $Ps = P_{bar} \times 13.6 + Psg$ | 410.1 | in. w abs. |
| 6. Stack Gas Speed | $Vs = 174\ Fs\ \sqrt{\Delta P Ts}\sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$ | 1487 | ft/min |
| 7. Stack Gas Flow Rate @ 70°F | a. $Qsw = \text{Eq. } 6 \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$ | 4007 | WSCF/min |
| | b. Qsd = Eq. 7a x (1. - Eq. 3) | 3702 | DSCF/min |
| 8. Material Flow | Ms = Eq. 7b x Eq. 4b x 60 | | lb/hr |
| 9. $XO_2$ factor | $XO_2f = 2090/(20.9 - XO_2\%)$ | 116.1 | N.D. |
| 10. Emission | a. E = Eq. 4b x Fe x Eq. 9 | $1.46 \times 10^{-2}$ | lb/MMBtu |
| | b. E = Eq. 4c x Fm x Eq. 9 x 1000 | 6.26 | ng/joule |
| 11. % Isokinetic | $I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$ | 99.7 | % |

| | Oil | Gas | Coal |
|---|---|---|---|
| Fe SC Feet/$10^4$ Btu | 92.2 | 87.4 | 98.2 |
| Fm SC Meters/$10^4$ joules | 0.002475 | 0.002346 | 0.002636 |

*Multiply $Vm_{std}$ by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

(1) does not include moisture from dessicant

(2) From TSFO data sheet 6002-15

# PARTICULATE EMISSION CALCULATIONS

Test No. 19-2 SASS Date 3-17-77 Location 19 Engr. HB

Unit No. _____ Fuel #6 O.L Sampling Train and Method SASS Train

Pitot Factor, Fs 0.83 Barometric Pressure, $P_{bar}$ 29.99 in. Hg

Tot. Liquid Collected, $V_{lc}$ 1327 ml Total Particulate, $M_n$ 2741.6 m gm

Velocity Head, ΔP 0.10 iwg Stack Temp., Ts 974 °R Stack Area, As 4.90 $ft^2$

Sample Volume, Vm 698.6 $ft^3$ Stack Press., Psg -0.20 iwg Excess $O_2$, $XO_2$% 3.0 %

Orifice Press. Diff., H 2.90 iwg Stack Gas Sp. Gravity, Gs 1 n.d.

Sample Time, θ 300 min Nozzle Dia., Dn 0.75 in. Meter Temp., $T_m$ _____ °R

*1. Sample Gas Volume $Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$ 704.7 SCF

2. Water Vapor $Vw_{std} = 0.0474\ V_{lc}$ 629 SCF

3. Moisture Content Bwo = Eq. 2/(Eq. 1 + Eq. 2) 0.082 N.D.

4. Concentration a. $C = 0.0154\ Mn/Vm_{std}$ 0.0599 grains/DSCF

b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$ $8.578 \times 10^{-6}$ lb/DSCF

c. $C = \text{Eq. 4b} \times 16.018 \times 10^3$ 0.137 grams/DSCM

5. Abs. Stack Press. $Ps = P_{bar} \times 13.6 + Psg$ 407.66 in. w abs.

6. Stack Gas Speed $Vs = 174\ Fs\ \sqrt{\Delta PTs}\sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$ 1424 ft/min

7. Stack Gas Flow Rate @ 70°F a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$ 3803 WSCF/min

b. Qsd = Eq. 7a x (1. - Eq. 3) 3492 DSCF/min

8. Material Flow Ms = Eq. 7b x Eq. 4b x 60 1.797 lb/hr

9. $XO_2$ factor $XO_2f = 2090/(20.9 - XO_2\%)$ 116.8 N.D.

10. Emission a. E = Eq. 4b x Fe x Eq. 9 0.092 lb/MMBtu

b. E = Eq. 4c x Fm x Eq. 9 x 1000 39.6 ng/joule

11. % Isokinetic $I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$ 107.4 %

| | Oil | Gas | Coal |
|---|---|---|---|
| Fe SC Feet/$10^4$ Btu | 92.2 | 87.4 | 98.2 |
| Fm SC Meters/$10^4$ joules | 0.002475 | 0.002346 | 0.002636 |

*Multiply $Vm_{std}$ by $530/T_m$(°R) if meter not temp. compensated. Data Sheet 6002-4

(1) does not include $H_2O$ in dessicant

## PARTICULATE EMISSION CALCULATIONS

Test No. 19-3SASS Date 3-21-77 Location 19 Engr. HB

Unit No. ________ Fuel #6 OIL Sampling Train and Method SASS Train

Pitot Factor, Fs 0.83 Barometric Pressure, $P_{bar}$ 30.19 in. Hg

Tot. Liquid Collected, $V_{lc}$ 1384 ml Total Particulate, $M_n$ 4698.1 m gm

Velocity Head, ΔP 0.10 iwg Stack Temp., Ts 1016 °R Stack Area, As 4.90 $ft^2$

Sample Volume, Vm 702.4 $ft^3$ Stack Press., Psg -0.22 iwg Excess $O_2$, $XO_2$% 1.8 %

Orifice Press. Diff., H 2.9 iwg Stack Gas Sp. Gravity, Gs 1 n.d.

Sample Time, θ 300 min Nozzle Dia., Dn 0.75 in. Meter Temp., $T_m$ 134 °R

*1. Sample Gas Volume $Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$ 713.3 SCF

2. Water Vapor $Vw_{std} = 0.0474\ V_{lc}$ 65.6 SCF

3. Moisture Content Bwo = Eq. 2/(Eq. 1 + Eq. 2) 0.084 N.D.

4. Concentration a. $C = 0.0154\ Mn/Vm_{std}$ 0.1014 grains/DSCF

b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$ $1.452 \times 10^{-5}$ lb/DSCF

c. $C = \text{Eq. 4b} \times 16.018 \times 10^3$ 0.233 grams/DSCM

5. Abs. Stack Press. $Ps = P_{bar} \times 13.6 + Psg$ 410.4 in. w abs.

6. Stack Gas Speed $Vs = 174\ Fs\ \sqrt{\Delta P Ts}\sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$ 1450 ft/min

7. Stack Gas Flow Rate @ 70°F a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$ 3736 WSCF/min

b. Qsd = Eq. 7a x (1. - Eq. 3) 3422 DSCF/min

8. Material Flow Ms = Eq. 7b x Eq. 4b x 60 2.982 lb/hr

9. $XO_2$ factor $XO_2f = 2090/(20.9 - XO_2\%)$ 109.4 N.D.

10. Emission a. E = Eq. 4b x Fe x Eq. 9 0.146 lb/MMBtu

b. E = Eq. 4c x Fm x Eq. 9 x 1000 63.1 ng/joule

11. % Isokinetic $I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$ 110.9 %

| | Oil | Gas | Coal |
|---|---|---|---|
| Fe SC Feet/$10^4$ Btu | 92.2 | 87.4 | 98.2 |
| Fm SC Meters/$10^4$ joules | 0.002475 | 0.002346 | 0.002636 |

*Multiply $Vm_{std}$ by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

## PARTICULATE EMISSION CALCULATIONS

Test No. 19-4 SASS Date 3-23-77 Location 19 Engr. #B

Unit No. ______ Fuel #6 oil Sampling Train and Method SASS Train

Pitot Factor, Fs 0.83 Barometric Pressure, $P_{bar}$ 29.83 in. Hg

Tot. Liquid Collected, $V_{lc}$ 1295 ml Total Particulate, $M_n$ 3844.6 m gm

Velocity Head, ΔP 0.09 iwg Stack Temp., Ts 994 °R Stack Area, As 4.9 $ft^2$

Sample Volume, Vm 703.46 $ft^3$ Stack Press., Psg -0.21 iwg Excess $O_2$, $XO_2$% 1.5 %

Orifice Press. Diff., H 2.87 iwg Stack Gas Sp. Gravity, Gs 1 n.d.

Sample Time, θ 300 min Nozzle Dia., Dn 0.75 in. Meter Temp., $T_m$ 584 °R

*1. Sample Gas Volume $Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$ 705.8 SCF

2. Water Vapor $Vw_{std} = 0.0474\ V_{lc}$ 61.4 SCF

3. Moisture Content $Bwo = \text{Eq. } 2/(\text{Eq. } 1 + \text{Eq. } 2)$ 0.080 N.D.

4. Concentration a. $C = 0.0154\ Mn/Vm_{std}$ 0.0839 grains/DSCF

b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$ $1.201 \times 10^{-5}$ lb/DSCF

c. $C = \text{Eq. } 4b \times 16.018 \times 10^3$ 0.1924 grams/DSCM

5. Abs. Stack Press. $Ps = P_{bar} \times 13.6 + Psg$ 405.48 in. w abs.

6. Stack Gas Speed $Vs = 174\ Fs \sqrt{\Delta P Ts} \sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$ 1368 ft/min

7. Stack Gas Flow Rate @ 70°F a. $Qsw = \text{Eq. } 6 \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$ 3562 WSCF/min

b. $Qsd = \text{Eq. } 7a \times (1. - \text{Eq. } 3)$ 3277 DSCF/min

8. Material Flow $Ms = \text{Eq. } 7b \times \text{Eq. } 4b \times 60$ 2.36 lb/hr.

9. $XO_2$ factor $XO_2f = 2090/(20.9 - XO_2\%)$ 107.7 N.D.

10. Emission a. $E = \text{Eq. } 4b \times Fe \times \text{Eq. } 9$ 0.119 lb/MMBtu

b. $E = \text{Eq. } 4c \times Fm \times \text{Eq. } 9 \times 1000$ 51.28 ng/joule

11. % Isokinetic $I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$ 114.7 %

| | Oil | Gas | Coal |
|---|---|---|---|
| Fe SC Feet/$10^4$ Btu | 92.2 | 87.4 | 98.2 |
| Fm SC Meters/$10^4$ joules | 0.002475 | 0.002346 | 0.002636 |

*Multiply $Vm_{std}$ by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

**KVB**

TRACE SPECIES AND ORGANICS TEST
SAMPLE RECOVERY LOG

Test No. 19-1 Date 3/10/77 Location 19

Sample Port Position MID-POINT / STACK / ~15" IN

| Container Number | Sample Description | Container Type | Net wt/vol. | Comment |
|---|---|---|---|---|
| 674 | $H_2O$ BLANK | NAL | 1000 ml | |
| 675 | IPA BLANK | NAL | 1000 ml | |
| 684 | 50-50 BLANK | NAL | 950 ml | |
| 685 | SIL. NIT. / AM. PER. SU. | NAL | 1000 ml | BLANK |
| 571 | XAD-2 BLANK | NAL | 402 ml | |
| 715 | PROBE/10M | NAL | 0.0605 g | SOLIDS |
| 592 | " | GL | 289 ml | $H_2O$ wash |
| 591 | " | GL | 385 ml | 50-50 wash |
| 725 | 3M | NAL | 0.0457 g | SOLIDS |
| 589 | " | GL | 163 ml | $H_2O$ |
| 730 | 1M | NAL | 0.0037 g | SOLIDS |
| 485 | " | GL | 175 ml | 50-50 |
| 491 | " | GL | 190 ml | $H_2O$ |
| 463 | FILTER | P/D | 0.3190 g | SOLIDS |
| 478 | " | GL | 72 ml | 50-50 |
| 484 | " | GL | 130 ml | $H_2O$ |
| 522 | 1st IMPINGER | NAL | 891 ml | SOLUTION |
| 590 | " | GL | 289 ml | IPA |
| 667 | 2nd IMPINGER | NAL | 792 ml | SOLUTION |
| 588 | " | GL | 258 ml | IPA |
| 586 | " | GL | 240 ml | $H_2O$ |
| 668 | 3rd IMPINGER | NAL | 725 ml | SOLUTION |
| 585 | " | GL | 300 ml | IPA |
| 584 | " | GL | 238 ml | $H_2O$ |
| 536 | XAD-2 | GL | 150 g | RESIN |
| 676 | " | NAL | 895 ml | CONDENSATE |
| 486 | " | GL | 200 ml | " |
| 583 | " | GL | 260 ml | RINSE 50-50 |
| 497 | " | GL | 150 ml | $H_2O$ |
| 19-1LF | No. 6 OIL | GL | 500 ml | OIL SAMPLE |

Data Sheet KVB 6002-15

Keeler Boiler

TEST 19 FUELS TABLE

| POLLUTANT | SAMPLE NUMBER | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 19-1 LF$^+$ | 19-1 LF$^+$ dup | 19-2 LF$^+$ | 19-2 LF dup | 19-3LF$^+$ | 19-3LF$^+$ dup | 19-4LF$^+$ | 19-4LF$^+$ dup. |
| Antimony | <25 | <25 | <25 | <25 | <25 | <25 | <25 | <25 |
| Arsenic | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Barium | <5 | <5 | <5 | <5 | <5 | <5 | 15 | 10 |
| Beryllium | <0.3 | <0.3 | <0.3 | <0.3 | <0.3 | <0.3 | <0.3 | <0.3 |
| Cadmium | <0.3 | <0.3 | <0.3 | <0.3 | <0.3 | <0.3 | <0.3 | <0.3 |
| Calcium | 31 | 30 | 31 | 43 | <10 | <10 | <10 | <10 |
| Chromium | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Cobalt | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Copper | <3 | <3 | <3 | <3 | <3 | <3 | <3 | <3 |
| Iron | 35 | 25 | 12 | 15 | 7 | 13 | 30 | 14 |
| Lead | <3 | <3 | <3 | <3 | <3 | <3 | 6 | <3 |
| Manganese | 0.5 | 0.1 | 1.4 | 0.8 | <0.5 | <0.5 | <0.5 | <0.5 |
| Mercury | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Nickel | 3.5 | 3.5 | 14 | 15 | <10 | <10 | <10 | <10 |
| Selenium | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| Tellurium | <25 | <25 | <25 | <25 | <25 | <25 | <25 | <25 |
| Tin | <25 | <25 | <25 | <25 | <25 | <25 | <25 | <25 |
| Titanium | <250 | <250 | <250 | <250 | <250 | <250 | <250 | <250 |
| Vanadium | 25 | 25 | 40 | 40 | 50 | 55 | 55 | 45 |
| Zinc | 6 | 4 | 3 | 4 | 5 | <5 | <5 | 5 |
| Chloride | <18.3 | — | <11.6 | - - | <34.4 | — | <46.3 | — |
| Fluoride | 38.7 | — | 45.8 | — | 34.6 | — | 41.0 | -— |
| Nitrates | — | — | — | — | — | — | — | — |
| Sulfates | — | — | — | — | — | — | — | — |

$^+$ µg/g

KEELER BOILER

TEST 19-1 TABLE STACK - #6 OIL BASELINE

| POLLUTANT | SAMPLE NUMBER | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 571+ | 685* | 674* | 684* | 675* | | | |
| Antimony | <27 | <0.5 | <0.5 | <0.5 | <0.5 | | | |
| Arsenic | <1 | <0.005 | <0.005 | <0.005 | <0.005 | | | |
| Barium | <11 | <0.1 | <0.1 | <0.1 | <0.1 | | | |
| Beryllium | <0.5 | <0.005 | <0.005 | <0.005 | <0.005 | | | |
| Cadmium | <0.5 | 0.01 | <0.005 | <0.005 | <0.005 | | | |
| Calcium | 9.3 | 0.49 | 0.12 | 0.25 | 0.16 | | | |
| Chromium | 2.7 | 0.05 | 0.05 | 0.05 | 0.05 | | | |
| Cobalt | 5.9 | <0.2 | <0.2 | <0.2 | <0.2 | | | |
| Copper | 1.6 | 0.03 | <0.02 | <0.02 | <0.02 | | | |
| Iron | 20 | 0.23 | 0.12 | 0.17 | 0.15 | | | |
| Lead | <2.7 | 0.06 | <0.05 | <0.05 | <0.05 | | | |
| Manganese | 0.5 | 0.02 | <0.01 | <0.01 | 0.02 | | | |
| Mercury | <0.02 | <0.005 | <0.005 | <0.005 | <0.005 | | | |
| Nickel | <2.7 | <0.05 | <0.05 | <0.05 | <0.05 | | | |
| Selenium | <1 | <0.01 | <0.01 | <0.01 | <0.01 | | | |
| Tellurium | <27 | <0.3 | <0.3 | <0.3 | <0.3 | | | |
| Tin | <54 | <1 | <1 | <1 | <1 | | | |
| Titanium | <16 | <1 | <1 | <1 | <1 | | | |
| Vanadium | <11 | <0.1 | <0.1 | <0.1 | <0.1 | | | |
| Zinc | 1.6 | 0.20 | 0.10 | 0.11 | 0.08 | | | |
| Chloride | 25.5 | 83.4 | <0.5 | <0.5 | 0.54 | | | |
| Fluoride | 28.8 | 0.77 | 0.12 | <0.1 | <0.1 | | | |
| Nitrates | <0.2 | 2.0 | <0.01 | 0.08 | 0.06 | | | |
| Sulfates | <50 | 31200 | 4.0 | 4.0 | 2.0 | | | |

+μg/g
*μg/ml

# KVB

## TRACE SPECIES AND ORGANICS TEST
## SAMPLE RECOVERY LOG

Test No. 19-2 Date 3-17-77 Location 19

Sample Port Position MID-POINT STACK / ~15' N

| Container Number | Sample Description | Container Type | Net wt/vol. | Comment |
|---|---|---|---|---|
| 566 | $NO_2$/ PROBE / 10M | NAL | 1.6620 | SOLIDS |
| 493 | " | GL | 115 | 50/50 |
| 489 | " | GL | 210 | " |
| 629 | " | GL | 140 | $H_2O$ |
| 483 | " | GL | 225 | " |
| 716 | 3 M | NAL | 0.4443 | SOLIDS |
| 619 | " | GL | 190 | 50/50 |
| 620 | " | GL | 200 | $H_2O$ |
| 720 | 1M | NAL | 0.2196 | SOLIDS |
| 621 | " | GL | 140 | 50/50 |
| 622 | " | GL | 165 | $H_2O$ |
| 538 | FILTER | PETRI | 0.4157 | SOLIDS |
| 625 | " | GL | 90 | 50/50 |
| 626 | " | GL | 130 | $H_2O$ |
| 521 | 1st IMP. | NAL | 985 | SOLUTION |
| 499 | " | GL | 232 | IPA |
| 481 | " | GL | 205 | $H_2O$ |
| 666 | 2nd IMP. | NAL | 782 | SOLUTION |
| 477 | " | GL | 125 | IPA |
| 487 | " | GL | 200 | $H_2O$ |
| 670 | 3rd IMP. | NAL | 755 | SOLUTION |
| 617 | " | GL | 165 | IPA |
| 623 | " | GL | 198 | $H_2O$ |
| 533 | XAD-2 | WMGL | | RESIN |
| 520 | " | NAL | 950 | CONDENSATE |
| 49 | " | GL | 105 | " |
| 415 | " | GL | 230 | 50/50 |
| 618 | " | GL | 230 | $H_2O$ |

KEELER BOILER

TEST 19-2 TABLE STACK - #6 OIL BASELINE

| POLLUTANT | SAMPLE NUMBER | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | $566^+$ | $716^+$ | $720^+$ | $538^+$ | $A^*$ | $B^*$ | $B^*$duplicate | $533^+$ |
| Antimony | <38 | <210 | <250 | <500 | <0.5 | <0.5 | <0.5 | <25 |
| Arsenic | <1.5 | 33 | <10 | 200 | 0.018 | <0.005 | 0.01 | <1 |
| Barium | 38 | 460 | 6000 | 800 | <0.1 | <0.1 | <0.1 | <10 |
| Beryllium | <0.8 | <4.2 | <5 | <10 | <0.005 | <0.005 | <0.005 | <0.5 |
| Cadmium | 0.8 | <4.2 | <5 | <10 | 0.005 | 0.34 | 0.33 | <1 |
| Calcium | 1900 | 1900 | 3500 | 4800 | 0.67 | 0.34 | 0.30 | 40 |
| Chromium | 72 | 140 | 310 | 240 | 0.14 | 14 | 14 | 8.5 |
| Cobalt | 120 | 310 | 940 | 1600 | <0.2 | 0.3 | 0.3 | 1 |
| Copper | 46 | 50 | 100 | 460 | 0.06 | 0.14 | 0.13 | <1 |
| Iron | 5400 | 7200 | 32000 | 21000 | 2.7 | 69 | 68 | 28 |
| Lead | 150 | <20 | <25 | 1000 | 0.14 | <0.05 | <0.05 | <2 |
| Manganese | 51 | 75 | 210 | 250 | 0.17 | 0.70 | 0.69 | 2 |
| Mercury | <0.03 | <0.17 | <0.2 | <0.4 | <0.005 | <0.005 | <0.005 | <0.02 |
| Nickel | 1900 | 2200 | 9000 | 30000 | 0.77 | 8.9 | 8.7 | <2 |
| Selenium | <1.5 | <8 | <10 | <20 | <0.01 | <0.01 | <0.01 | <1 |
| Tellurium | <38 | <210 | <250 | <500 | <0.3 | <0.3 | <0.3 | <25 |
| Tin | <76 | <420 | <500 | <1000 | <1 | <1 | <1 | <50 |
| Titanium | 460 | <1200 | 2500 | <2000 | <1 | <1 | <1 | <150 |
| Vanadium | 6300 | 10000 | 43000 | 27000 | 2.5 | 0.2 | 0.2 | <10 |
| Zinc | 400 | 400 | 1300 | 4900 | 1.8 | 0.13 | 0.14 | 10 |
| Chloride | 279 | — | — | 11600 | 2.12 | <0.5 | <0.5 | <10 |
| Fluoride | 205 | 134 | 909 | <2 | <0.1 | 0.16 | 0.23 | 15 |
| Nitrates | 113 | — | — | 37.5 | 0.28 | 0.88 | 3.80 | 3.61 |
| Sulfates | 14200 | — | — | 457000 | 11.0 | 262 | 250 | 66.6 |
| | | | | | 489,493,<br>483,629,<br>619,620,<br>621,622,<br>625,626 | 495,<br>618 | | |

KEELER BOILER

TEST 19-2 TABLE STACK - #6 OIL BASELINE

| POLLUTANT | SAMPLE NUMBER | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 533* duplicate | $C_1$* | C* | C* duplicate | | | | |
| Antimony | <25 | no metal analyses on sub-one samples | <0.5 | <0.5 | | | | |
| Arsenic | <1 | | <0.005 | <0.005 | | | | |
| Barium | 50 | | <0.1 | <0.1 | | | | |
| Beryllium | <0.5 | | <0.005 | <0.005 | | | | |
| Cadmium | <0.5 | | 0.02 | 0.015 | | | | |
| Calcium | 10 | | 0.14 | 0.10 | | | | |
| Chromium | 7 | | 1.4 | 1.3 | | | | |
| Cobalt | 2 | | <0.2 | <0.2 | | | | |
| Copper | 1 | | 0.04 | 0.05 | | | | |
| Iron | 27 | | 4.3 | 4.0 | | | | |
| Lead | <2 | | <0.05 | <0.05 | | | | |
| Manganese | 2 | | 0.08 | 0.07 | | | | |
| Mercury | <0.02 | | <0.005 | <0.005 | | | | |
| Nickel | <2 | | 0.7 | 0.7 | | | | |
| Selenium | <1 | | <0.01 | <0.01 | | | | |
| Tellurium | <25 | | <0.3 | <0.3 | | | | |
| Tin | <50 | | <1 | <1 | | | | |
| Titanium | <150 | | <1 | <1 | | | | |
| Vanadium | <10 | | <0.1 | <0.1 | | | | |
| Zinc | 1.5 | | 0.09 | 0.12 | | | | |
| Chloride | <11 | — | 61.2 | 59.0 | | | | |
| Fluoride | 18 | — | 0.70 | 0.65 | | | | |
| Nitrates | 2.20 | 0.40 | — | — | | | | |
| Sulfates | 69.9 | 19600 | — | — | | | | |
| | | 520,490,<br>521,499,<br>481 | 520,490,<br>521,499,<br>481,666,<br>477,487,<br>670,617,<br>623 | | | | | |

**COMMERCIAL TESTING & ENGINEERING CO.**
GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434
Reply to INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST 44TH AVENUE, GOLDEN, COLORADO 80401, PHONE: 303-278-9521

To: Mr. John C. Michalovic
Calspan Corporation
Post Office Box 235
Buffalo, NY 14221

Date: July 1, 1977

Analyst: S. Sweeney

P. O. No.: 27810

Sample No.: Test 19-2 D 566, 716, 720, 538 5/18/77

IAD No.: 97-A345-134-21

CONCENTRATION IN PPM WEIGHT

| ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. |
|---|---|---|---|---|---|---|---|
| Uranium | ≤0.7 | Terbium | 0.3 | Ruthenium | | Vanadium | MC |
| Thorium | 1 | Gadolinium | 1 | Molybdenum | MC | Titanium | 330 |
| Bismuth | 0.3 | Europium | 0.3 | Niobium | 0.4 | Scandium | 0.2 |
| Lead | 380 | Samarium | 2 | Zirconium | 5 | Calcium | MC |
| Thallium | | Neodymium | 19 | Yttrium | 1 | Potassium | MC |
| Mercury | NR | Praseodymium | 11 | Strontium | 110 | Chlorine | 32 |
| Gold | | Cerium | 22 | Rubidium | 1 | Sulfur | MC |
| Platinum | | Lanthanum | 190 | Bromine | 0.7 | Phosphorus | MC |
| Iridium | | Barium | MC | Selenium | 10 | Silicon | MC |
| Osmium | | Cesium | 0.1 | Arsenic | 18 | Aluminum | MC |
| Rhenium | | Iodine | 0.4 | Germanium | 0.8 | Magnesium | MC |
| Tungsten | 0.8 | Tellurium | 0.3 | Gallium | 12 | Sodium | MC |
| Tantalum | | Antimony | 26 | Zinc | MC | Fluorine | ≈59 |
| Hafnium | 0.5 | Tin | 3 | Copper | 280 | Oxygen | NR |
| Lutetium | 0.1 | Indium | STD | Nickel | MC | Nitrogen | NR |
| Ytterbium | 0.7 | Cadmium | 0.6 | Cobalt | MC | Carbon | NR |
| Thulium | 0.1 | Silver | 7 | Iron | MC | Boron | 18 |
| Erbium | 0.5 | Palladium | | Manganese | 140 | Beryllium | 0.4 |
| Holmium | 0.7 | Rhodium | | Chromium | 96 | Lithium | 4 |
| Dysprosium | 1 | | | | | Hydrogen | NR |

NR — Not Reported
All elements not reported <0.1 ppm

Approved: M L Jacobs

**COMMERCIAL TESTING & ENGINEERING CO.**
Reply to
GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434
INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST 44TH AVENUE, GOLDEN, COLORADO 80401, PHONE 303-278-9521

To: Mr. John C. Michalovic
Calspan Corporation
Post Office Box 235
Buffalo, NY 14221

Date: July 1, 1977

Analyst: S. Sweeney

P. O. No.: 27810

Sample No.: Test 19-2 E 533 5/18/77

IAD No.: 97-A345-134-21

CONCENTRATION IN PPM WEIGHT

| ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. |
|---|---|---|---|---|---|---|---|
| Uranium | | Terbium | | Ruthenium | | Vanadium | 0.2 |
| Thorium | | Gadolinium | | Molybdenum | 11 | Titanium | 2 |
| Bismuth | | Europium | | Niobium | | Scandium | <0.1 |
| Lead | ≤2 | Samarium | | Zirconium | 3 | Calcium | 46 |
| Thallium | | Neodymium | | Yttrium | | Potassium | 28 |
| Mercury | NR | Praseodymium | | Strontium | 0.2 | Chlorine | 3 |
| Gold | | Cerium | ≤0.6 | Rubidium | ≤0.1 | Sulfur | 93 |
| Platinum | | Lanthanum | | Bromine | 2 | Phosphorus | 6 |
| Iridium | | Barium | 1 | Selenium | | Silicon | 39 |
| Osmium | | Cesium | | Arsenic | 0.4 | Aluminum | 6 |
| Rhenium | | Iodine | 0.5 | Germanium | | Magnesium | 5 |
| Tungsten | | Tellurium | | Gallium | ≤0.3 | Sodium | 14 |
| Tantalum | | Antimony | 1 | Zinc | 3 | Fluorine | =6 |
| Hafnium | | Tin | ≤1 | Copper | 2 | Oxygen | NR |
| Lutetium | | Indium | STD | Nickel | 0.6 | Nitrogen | NR |
| Ytterbium | | Cadmium | ≤0.7 | Cobalt | <0.1 | Carbon | NR |
| Thulium | | Silver | ≤0.8 | Iron | 6 | Boron | 11 |
| Erbium | | Palladium | | Manganese | 0.1 | Beryllium | |
| Holmium | | Rhodium | | Chromium | 0.5 | Lithium | INT |
| Dysprosium | | | | | | Hydrogen | NR |

NR — Not Reported
All elements not reported <0.4 ppm weight
INT-Interference Sample was thermally ashed @ 350° C for one hour in a laboratory furnace in a quartz crucible prior to analysis.

Approved:

**COMMERCIAL TESTING & ENGINEERING CO.**
GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434
Reply to INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST 44TH AVENUE, GOLDEN, COLORADO 80401, PHONE: 303-278-9521

To: Mr. John G. Michalovic
Calspan Corporation
Post Office Box 235
Buffalo, NY 14221

Date: July 5, 1977

Analyst: S. Sweeney

P. O. No.: 27810

Sample No.: Test 19-2 F Composites B & C 5/18/77

IAD No.: 97-A345-134-21

CONCENTRATION IN μg/ml

| ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. |
|---|---|---|---|---|---|---|---|
| Uranium | ≤0.005 | Terbium | | Ruthenium | | Vanadium | 0.03 |
| Thorium | ≤0.006 | Gadolinium | | Molybdenum | 0.2 | Titanium | 0.006 |
| Bismuth | | Europium | | Niobium | | Scandium | ≤0.001 |
| Lead | 0.009 | Samarium | | Zirconium | 0.004 | Calcium | ≥8 |
| Thallium | | Neodymium | | Yttrium | | Potassium | 3 |
| Mercury | NR | Praseodymium | <0.001 | Strontium | 0.003 | Chlorine | 0.1 |
| Gold | <0.001 | Cerium | 0.001 | Rubidium | <0.001 | Sulfur | MC |
| Platinum | | Lanthanum | 0.002 | Bromine | 0.04 | Phosphorus | 0.9 |
| Iridium | | Barium | 0.02 | Selenium | 0.003 | Silicon | 1 |
| Osmium | | Cesium | 0.002 | Arsenic | 0.005 | Aluminum | 0.05 |
| Rhenium | | Iodine | 0.005 | Germanium | | Magnesium | 0.08 |
| Tungsten | | Tellurium | | Gallium | <0.001 | Sodium | >1 |
| Tantalum | | Antimony | | Zinc | 0.08 | Fluorine | ≈0.04 |
| Hafnium | | Tin | 0.002 | Copper | 0.06 | Oxygen | NR |
| Lutetium | | Indium | STD | Nickel | 0.8 | Nitrogen | NR |
| Ytterbium | | Cadmium | 0.03 | Cobalt | 0.04 | Carbon | NR |
| Thulium | | Silver | MC | Iron | 5 | Boron | 0.001 |
| Erbium | | Palladium | | Manganese | 0.2 | Beryllium | |
| Holmium | | Rhodium | | Chromium | 4 | Lithium | ≤0.001 |
| Dysprosium | | | | | | Hydrogen | NR |

NR – Not Reported
All elements not reported <0.001 μg/ml

Approved: M L Jacobs

Sample was thermally ashed @ 350° C for one hour in a laboratory furnace in a quartz crucible

**COMMERCIAL TESTING & ENGINEERING CO.**
GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434
Reply to INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST 44TH AVENUE, GOLDEN, COLORADO 80401, PHONE: 303-278-9521

To: Mr. John C. Michalovic
Calspan Corporation
Post Office Box 235
Buffalo, NY 14221

Date: July 14, 1977

Analyst: S. Sweeney

P. O. No.: 27810

Sample No.: Test 19-2 G LF #6 Fuel Oil 5-18-77

IAD No.: 97-A345-134-21

CONCENTRATION IN PPM WEIGHT

| ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. |
|---|---|---|---|---|---|---|---|
| Uranium | | Terbium | | Ruthenium | | Vanadium | 250 |
| Thorium | | Gadolinium | | Molybdenum | 6 | Titanium | 0.8 |
| Bismuth | | Europium | | Niobium | | Scandium | ≤0.1 |
| Lead | 0.8 | Samarium | | Zirconium | 0.9 | Calcium | 210 |
| Thallium | | Neodymium | | Yttrium | | Potassium | 23 |
| Mercury | NR | Praseodymium | | Strontium | 1 | Chlorine | 3 |
| Gold | | Cerium | | Rubidium | | Sulfur | MC |
| Platinum | | Lanthanum | | Bromine | | Phosphorus | 29 |
| Iridium | | Barium | 8 | Selenium | ≤0.5 | Silicon | 23 |
| Osmium | | Cesium | | Arsenic | 0.4 | Aluminum | 19 |
| Rhenium | | Iodine | | Germanium | | Magnesium | 24 |
| Tungsten | | Tellurium | | Gallium | | Sodium | 210 |
| Tantalum | | Antimony | | Zinc | 3 | Fluorine | ≈5 |
| Hafnium | | Tin | ≤0.4 | Copper | 2 | Oxygen | NR |
| Lutetium | | Indium | STD | Nickel | 56 | Nitrogen | NR |
| Ytterbium | | Cadmium | | Cobalt | 3 | Carbon | NR |
| Thulium | | Silver | | Iron | 63 | Boron | 0.6 |
| Erbium | | Palladium | | Manganese | 0.3 | Beryllium | |
| Holmium | | Rhodium | | Chromium | 0.4 | Lithium | <0.1 |
| Dysprosium | | | | | | Hydrogen | NR |

NR — Not Reported
All elements not reported <0.1 ppm weight

Approved:

Sample was thermally ashed @ 350°C for one hour in a laboratory furnace in a quartz crucible prior to analysis

**COMMERCIAL TESTING & ENGINEERING CO.**
Reply to
GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434
INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST 44TH AVENUE, GOLDEN, COLORADO 80401, PHONE: 303-278-9521

To: Mr. John C. Michalovic
Calspan Corporation
Post Office Box 235
Buffalo, NY 14221

Date: July 14, 1977

Analyst: S. Sweeney

P. O. No.: 27810

Sample No.: Test 19-2 G LF #6 Fuel Oil Duplicate
5-18-77

IAD No.: 97-A345-134-21

CONCENTRATION IN PPM WEIGHT

| ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. |
|---|---|---|---|---|---|---|---|
| Uranium | | Terbium | | Ruthenium | | Vanadium | 430 |
| Thorium | | Gadolinium | | Molybdenum | 6 | Titanium | 1 |
| Bismuth | | Europium | | Niobium | | Scandium | ≤0.1 |
| Lead | ≤1 | Samarium | | Zirconium | ≤0.4 | Calcium | 190 |
| Thallium | | Neodymium | | Yttrium | | Potassium | 63 |
| Mercury | NR | Praseodymium | | Strontium | 0.3 | Chlorine | 1 |
| Gold | | Cerium | | Rubidium | | Sulfur | MC |
| Platinum | | Lanthanum | | Bromine | | Phosphorus | 11 |
| Iridium | | Barium | 2 | Selenium | ≤1 | Silicon | 19 |
| Osmium | | Cesium | | Arsenic | 0.2 | Aluminum | 8 |
| Rhenium | | Iodine | | Germanium | | Magnesium | 27 |
| Tungsten | | Tellurium | | Gallium | | Sodium | ≥650 |
| Tantalum | | Antimony | | Zinc | 4 | Fluorine | =3 |
| Hafnium | | Tin | ≤0.5 | Copper | 2 | Oxygen | NR |
| Lutetium | | Indium | STD | Nickel | 47 | Nitrogen | NR |
| Ytterbium | | Cadmium | | Cobalt | 2 | Carbon | NR |
| Thulium | | Silver | | Iron | 19 | Boron | 1 |
| Erbium | | Palladium | | Manganese | 0.3 | Beryllium | |
| Holmium | | Rhodium | | Chromium | 0.4 | Lithium | 0.4 |
| Dysprosium | | | | | | Hydrogen | NR |

NR – Not Reported
All elements not reported <0.2 ppm weight

Approved:

Sample was thermally ashed @ 350°C for one hour in a laboratory furnace in a quartz crucible

**COMMERCIAL TESTING & ENGINEERING CO.**
GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434
Reply to INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST 44TH AVENUE, GOLDEN, COLORADO 80401, PHONE 303-278-9521

To: Mr. John C. Michalovic
Calspan Corporation
P. O. Box 235
Buffalo, NY 14221

Date: July 1, 1977

Analyst: S. Sweeney

P. O. No.:

Sample No.: Test 19-1 H

IAD No.: 97-A345-134-21

CONCENTRATION IN PPM WEIGHT

| ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. |
|---|---|---|---|---|---|---|---|
| Uranium | | Terbium | | Ruthenium | | Vanadium | 0.1 |
| Thorium | | Gadolinium | | Molybdenum | 9 | Titanium | 0.9 |
| Bismuth | | Europium | | Niobium | | Scandium | <0.1 |
| Lead | ≤1 | Samarium | | Zirconium | 2 | Calcium | 16 |
| Thallium | | Neodymium | | Yttrium | | Potassium | 26 |
| Mercury | NR | Praseodymium | | Strontium | 0.5 | Chlorine | 7 |
| Gold | | Cerium | | Rubidium | 0.2 | Sulfur | 2 |
| Platinum | | Lanthanum | | Bromine | 1 | Phosphorus | 4 |
| Iridium | | Barium | 1 | Selenium | | Silicon | 24 |
| Osmium | | Cesium | ≤0.1 | Arsenic | ≤0.3 | Aluminum | 3 |
| Rhenium | | Iodine | ≤0.3 | Germanium | | Magnesium | 6 |
| Tungsten | | Tellurium | | Gallium | ≤0.2 | Sodium | 9 |
| Tantalum | | Antimony | | Zinc | 9 | Fluorine | ≃4 |
| Hafnium | | Tin | | Copper | 2 | Oxygen | NR |
| Lutetium | | Indium | STD | Nickel | 2 | Nitrogen | NR |
| Ytterbium | | Cadmium | | Cobalt | ≤0.1 | Carbon | NR |
| Thulium | | Silver | ≤0.3 | Iron | 2 | Boron | 12 |
| Erbium | | Palladium | | Manganese | <0.1 | Beryllium | |
| Holmium | | Rhodium | | Chromium | 2 | Lithium | <0.1 |
| Dysprosium | | | | | | Hydrogen | NR |

NR – Not Reported
All elements not reported <0.3ppm weight

Approved:

Sample was thermally ashed @350$^{0}$ C for one hour in a laboratory furnace in a quartz crucible prior to analysis

**COMMERCIAL TESTING & ENGINEERING CO.**
Reply to
GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434
INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST 44TH AVENUE, GOLDEN, COLORADO 80401, PHONE: 303-278-9521

To: Mr. John G. Michalovic
Calspan Corporation
Post Office Box 235
Buffalo, NY 14221

Date: July 5, 1977

Analyst: S. Sweeney

P. O. No.: 27810

Sample No.: Test 19-11 685 5/18/77

IAD No.: 97-A345-134-21

CONCENTRATION IN µg/ml

| ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. |
|---|---|---|---|---|---|---|---|
| Uranium | 0.01 | Terbium | | Ruthenium | | Vanadium | 0.004 |
| Thorium | ≤0.01 | Gadolinium | | Molybdenum | 0.1 | Titanium | 0.4 |
| Bismuth | | Europium | | Niobium | | Scandium | ≤0.001 |
| Lead | 0.02 | Samarium | | Zirconium | *0.08 | Calcium | 6 |
| Thallium | | Neodymium | | Yttrium | | Potassium | 5 |
| Mercury | NR | Praseodymium | | Strontium | 0.01 | Chlorine | 0.2 |
| Gold | | Cerium | | Rubidium | <0.001 | Sulfur | MC |
| Platinum | | Lanthanum | 0.01 | Bromine | 0.009 | Phosphorus | 4 |
| Iridium | | Barium | 0.03 | Selenium | ≤0.02 | Silicon | 1 |
| Osmium | | Cesium | 0.007 | Arsenic | 0.01 | Aluminum | 0.1 |
| Rhenium | | Iodine | 0.003 | Germanium | ≤0.001 | Magnesium | 0.4 |
| Tungsten | 0.02 | Tellurium | | Gallium | | Sodium | >3 |
| Tantalum | | Antimony | ≤0.003 | Zinc | 1 | Fluorine | ≈6 |
| Hafnium | | Tin | 0.05 | Copper | 0.04 | Oxygen | NR |
| Lutetium | | Indium | STD | Nickel | 0.7 | Nitrogen | NR |
| Ytterbium | | Cadmium | 0.002 | Cobalt | 0.09 | Carbon | NR |
| Thulium | | Silver | MC | Iron | 0.2 | Boron | 0.009 |
| Erbium | | Palladium | | Manganese | 0.004 | Beryllium | |
| Holmium | | Rhodium | | Chromium | 2 | Lithium | 0.02 |
| Dysprosium | | | | | | Hydrogen | NR |

*Heterogeneous
NR – Not Reported
All elements not reported <0.001 µg/ml

Approved:

Sample was thermally ashed @ 350° C for one hour in a laboratory furnace in a quartz crucible

**COMMERCIAL TESTING & ENGINEERING CO.**
GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434
Reply to INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST 44TH AVENUE, GOLDEN, COLORADO 80401, PHONE: 303-278-9521

To: Mr. John G. Michalovic
Calspan Corporation
Post Office Box 235
Buffalo, NY 14221

Date: July 5, 1977

Analyst: S. Sweeney

P. O. No.: 27810

Sample No.: Test 19-1 J674 5/18/77

IAD No.: 97-A345-134-21

CONCENTRATION IN μg/ml

| ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. |
|---|---|---|---|---|---|---|---|
| Uranium | ≤0.05 | Terbium | | Ruthenium | | Vanadium | 0.002 |
| Thorium | ≤0.06 | Gadolinium | | Molybdenum | 0.08 | Titanium | 0.1 |
| Bismuth | | Europium | | Niobium | | Scandium | ≤0.004 |
| Lead | 0.03 | Samarium | | Zirconium | 0.04 | Calcium | MC |
| Thallium | | Neodymium | | Yttrium | | Potassium | MC |
| Mercury | NR | Praseodymium | | Strontium | 0.09 | Chlorine | 0.2 |
| Gold | ≤0.005 | Cerium | 0.009 | Rubidium | 0.001 | Sulfur | MC |
| Platinum | | Lanthanum | 0.02 | Bromine | 0.02 | Phosphorus | MC |
| Iridium | | Barium | 0.02 | Selenium | ≤0.009 | Silicon | 0.9 |
| Osmium | | Cesium | ≤0.002 | Arsenic | ≤0.003 | Aluminum | 0.8 |
| Rhenium | | Iodine | 0.007 | Germanium | | Magnesium | 1 |
| Tungsten | | Tellurium | | Gallium | | Sodium | MC |
| Tantalum | | Antimony | | Zinc | 0.09 | Fluorine | =3 |
| Hafnium | | Tin | | Copper | 0.03 | Oxygen | NR |
| Lutetium | | Indium | STD | Nickel | 0.02 | Nitrogen | NR |
| Ytterbium | | Cadmium | ≤0.01 | Cobalt | ≤0.01 | Carbon | NR |
| Thulium | | Silver | ≤0.007 | Iron | 0.1 | Boron | 0.006 |
| Erbium | | Palladium | | Manganese | 0.01 | Beryllium | |
| Holmium | | Rhodium | | Chromium | 0.02 | Lithium | ≤0.001 |
| Dysprosium | | | | | | Hydrogen | NR |

NR — Not Reported
All elements not reported <0.1 ppm weight

Approved: M S Jacobs

**COMMERCIAL TESTING & ENGINEERING CO.**
GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434
Reply to INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST 44TH AVENUE, GOLDEN, COLORADO 80401, PHONE: 303-278-9521

To: Mr. John G. Michalovic
Calspan Corporation
Post Office Box 235
Buffalo, NY 14221

Date: July 1, 1977

Analyst: S. Sweeney

P. O. No.: 27810

Sample No.: Test 19-1 K 684 5/18/77

IAD No.: 97-A345-134-21

CONCENTRATION IN µg/ml

| ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. |
|---|---|---|---|---|---|---|---|
| Uranium | | Terbium | | Ruthenium | | Vanadium | 0.002 |
| Thorium | | Gadolinium | | Molybdenum | 0.2 | Titanium | 0.08 |
| Bismuth | | Europium | | Niobium | | Scandium | ≤0.002 |
| Lead | ≤0.04 | Samarium | | Zirconium | 0.02 | Calcium | 2 |
| Thallium | | Neodymium | | Yttrium | | Potassium | 0.5 |
| Mercury | NR | Praseodymium | | Strontium | 0.07 | Chlorine | 1 |
| Gold | | Cerium | ≤0.01 | Rubidium | ≤0.002 | Sulfur | 6 |
| Platinum | | Lanthanum | | Bromine | 0.06 | Phosphorus | 2 |
| Iridium | | Barium | 0.2 | Selenium | ≤0.01 | Silicon | 0.6 |
| Osmium | | Cesium | ≤0.003 | Arsenic | ≤0.004 | Aluminum | 0.04 |
| Rhenium | | Iodine | 0.008 | Germanium | | Magnesium | 0.9 |
| Tungsten | | Tellurium | | Gallium | | Sodium | 3 |
| Tantalum | | Antimony | | Zinc | 0.2 | Fluorine | ≈3 |
| Hafnium | | Tin | | Copper | 0.05 | Oxygen | NR |
| Lutetium | | Indium | STD | Nickel | 0.06 | Nitrogen | NR |
| Ytterbium | | Cadmium | | Cobalt | ≤0.001 | Carbon | NR |
| Thulium | | Silver | ≤0.02 | Iron | 0.09 | Boron | 0.008 |
| Erbium | | Palladium | | Manganese | 0.004 | Beryllium | |
| Holmium | | Rhodium | | Chromium | 0.04 | Lithium | <0.001 |
| Dysprosium | | | | | | Hydrogen | NR |

NR – Not Reported
All elements not reported < 0.01 µg/ml

Approved:

Sample was thermally ashed @ 350° C for one hour in a laboratory furnace in a quartz crucibl

**COMMERCIAL TESTING & ENGINEERING CO.**
GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434
Reply to INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST 44TH AVENUE, GOLDEN, COLORADO 80401, PHONE: 303-278-9521

To: Mr. John G. Michalovic
Calspan Corporation
Post Office Box 235
Buffalo, NY 14221

Date: July 1, 1977

Analyst: S. Sweeney

P. O. No.: 27810

Sample No.: Test 19-1 L 675 5/18/77

IAD No.: 97-A345-134-21

CONCENTRATION IN µg/ml

| ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. |
|---|---|---|---|---|---|---|---|
| Uranium | | Terbium | | Ruthenium | | Vanadium | ≤0.01 |
| Thorium | | Gadolinium | | Molybdenum | 0.4 | Titanium | 0.2 |
| Bismuth | | Europium | | Niobium | | Scandium | ≤0.007 |
| Lead | ≤0.2 | Samarium | | Zirconium | ≤0.1 | Calcium | 0.9 |
| Thallium | | Neodymium | | Yttrium | | Potassium | 1 |
| Mercury | NR | Praseodymium | | Strontium | 0.02 | Chlorine | 2 |
| Gold | | Cerium | | Rubidium | 0.01 | Sulfur | 3 |
| Platinum | | Lanthanum | | Bromine | 0.09 | Phosphorus | 0.6 |
| Iridium | | Barium | ≤0.1 | Selenium | ≤0.06 | Silicon | 1 |
| Osmium | | Cesium | ≤0.02 | Arsenic | ≤0.02 | Aluminum | 0.2 |
| Rhenium | | Iodine | | Germanium | | Magnesium | 0.4 |
| Tungsten | | Tellurium | | Gallium | ≤0.03 | Sodium | 0.8 |
| Tantalum | | Antimony | | Zinc | 0.1 | Fluorine | .1 |
| Hafnium | | Tin | | Copper | 0.05 | Oxygen | NR |
| Lutetium | | Indium | STD | Nickel | 0.07 | Nitrogen | NR |
| Ytterbium | | Cadmium | | Cobalt | | Carbon | NR |
| Thulium | | Silver | | Iron | 0.2 | Boron | 0.03 |
| Erbium | | Palladium | | Manganese | 0.006 | Beryllium | |
| Holmium | | Rhodium | | Chromium | 0.04 | Lithium | 0.003 |
| Dysprosium | | | | | | Hydrogen | NR |

NR – Not Reported
All elements not reported <0.04 µg/ml
*Heterogeneous

Approved: M J Jacobs

## KVB Analysis Data

| Test | Sample Number | POM's | PCB's |
|---|---|---|---|
| 19-1 | LF | * | * |
| 19-2 | 533 | < 0.1 ug/g | < 1 ug/g |
|  | 533 (duplicate) | < 0.1 ug/g | < 1 ug/g |
|  | C | < 1 ug/l | < 1 ug/l |
|  | C (duplicate) | < 1 ug/l | < 1 ug/l |
|  | LF | * | * |

*Sample extracts too concentrated to be able to determine an analytical value.

# KVB

## TRACE SPECIES AND ORGANICS TEST
## SAMPLE RECOVERY LOG

**Test No.** 19-3 **Date** 3-21-77 **Location** 19

**Sample Port Position** MID-POINT/STACK/~15" IN

| Container Number | Sample Description | Container Type | Net wt/vol. | Comment |
|---|---|---|---|---|
| 722 | NOZ/PROBE/10 m | NAL | 2.4163 | SOLIDS |
| 633 | " " " | GL | 160 | 50/50 |
| 628 | " " " | GL | 225 | " |
| 639 | " " " | GL | 210 | $H_2O$ |
| 638 | " " " | GL | 210 | " |
| 723 | 3 m | NAL | 1.0724 | SOLIDS |
| 634 | " | GL | 206 | 50/50 |
| 640 | " | GL | 208 | $H_2O$ |
| 726 | 1 m | NAL | .2120 | SOLIDS |
| 641 | " | GL | 187 | 50/50 |
| 642 | " | GL | 187 | $H_2O$ |
| 539 | FILTER | P.D. | .9974 | SOLIDS |
| 643 | " | GL | 82 | 50/50 |
| 644 | " | GL | 164 | $H_2O$ |
| 673 | IMPINGER #1 | NAL | 938 | SOLUTION |
| 635 | " | GL | 191 | IPA |
| 630 | " | GL | 162 | $H_2O$ |
| 519 | IMPINGER #2 | NAL | 787 | SOLUTION |
| 631 | " | GL | 180 | IPA |
| 636 | " | GL | 160 | $H_2O$ |
| 686 | IMPINGER #3 | NAL | 737 | SOLUTION |
| 637 | " | GL | 149 | IPA |
| 632 | " | GL | 140 | $H_2O$ |
| 537 | XAD-2 | GL | – | RESIN |
| 665 | " | NAL | 1020 | CONDENSATE |
| 624 | " | GL | 152 | " |
| 627 | " | GL | 205 | 50/50 |
| 647 | " | GL | 215 | " |
| 653 | " | GL | 58 | $H_2O$ |
| 659 | " | GL | 225 | " |
| | | | | |
| | | | | |
| | | | | |
| 688 | $H_2O$ BLANK | NAL | 1000 | BLANK |

Data Sheet KVB 6002-15

MH&RP

KEELER BOILER

TEST 19-3 TABLE STACK - #6 OIL LOW NO$_x$ COND.

| POLLUTANT | SAMPLE NUMBER | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 722$^{+}$ | 723$^{+}$ | 726$^{+}$ | 539$^{+}$ | A$^{*}$ | B$^{*}$ | 537$^{+}$ | C$_1^{*}$ |
| Antimony | <50 | <2500 | <830 | <170 | <0.5 | <0.5 | <25 | |
| Arsenic | 4 | <100 | <33 | 33 | 0.01 | 0.005 | 7 | |
| Barium | 480 | <1000 | <330 | 730 | <0.1 | <0.1 | 75 | |
| Beryllium | <1 | <50 | <17 | <3.3 | <0.005 | <0.005 | <0.5 | |
| Cadmium | <1 | <50 | <17 | <3.3 | <0.005 | 0.015 | <0.5 | |
| Calcium | 1900 | 3500 | 3000 | 3100 | 15 | 0.20 | <5.0 | |
| Chromium | 69 | 950 | 300 | 180 | 0.05 | 8.4 | 8 | |
| Cobalt | 104 | 450 | 300 | 807 | <0.2 | <0.2 | 1.5 | |
| Copper | 43 | <50 | <150 | 200 | 0.11 | 0.11 | 0.5 | |
| Iron | 5200 | 4400 | 6500 | 20000 | 1.9 | 38 | 31 | |
| Lead | — | — | — | — | 0.11 | <0.05 | — | |
| Manganese | 49 | 200 | 117 | 160 | 0.16 | 0.57 | 2.0 | |
| Mercury | 0.5 | <2.0 | <0.67 | <0.13 | <0.005 | <0.005 | <0.02 | |
| Nickel | 970 | 1700 | 3000 | 13000 | 0.5 | 5.9 | <2.5 | |
| Selenium | <2.0 | <5000 | <33 | <6.7 | 0.04 | 0.04 | <1.0 | |
| Tellurium | <50 | <2500 | <830 | <170 | <0.3 | <0.3 | <25 | |
| Tin | <100 | <5000 | <1700 | <330 | <1 | <1 | <50 | |
| Titanium | 600 | <15,000 | 5000 | <1000 | <1 | <1 | <150 | |
| Vanadium | 5400 | 7000 | 14000 | 43000 | 1.4 | <0.1 | <10 | |
| Zinc | 281 | 250 | 350 | 3000 | 0.59 | 0.08 | 1.5 | |
| Chloride | <30 | <97 | — | 1710 | <0.5 | 1.6 | <11 | — |
| Fluoride | 54 | — | — | <1 | <0.1 | <0.1 | 18 | — |
| Nitrates | 43.0 | 67.0 | — | 46.1 | 0.30 | 0.92 | <0.2 | 0.42 |
| Sulfates | 8910 | 14000 | — | 170,000 | 16.0 | 135 | 289 | 10200 |
| | | | | | 633,628,<br>639,638,<br>634,640,<br>641,642,<br>643,644 | 627,647<br>653,659 | | 665,624<br>673,635,<br>630 |

KEELER BOILER

TEST 19-3 TABLE STACK - #6 OIL LOW $NO_x$ COND.

| POLLUTANT | SAMPLE NUMBER | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | C* | C* duplicate | | | | | | |
| Antimony | <0.5 | <0.5 | | | | | | |
| Arsenic | 0.005 | <0.005 | | | | | | |
| Barium | <0.1 | <0.1 | | | | | | |
| Beryllium | <0.005 | <0.005 | | | | | | |
| Cadmium | 0.020 | 0.010 | | | | | | |
| Calcium | 0.11 | 0.20 | | | | | | |
| Chromium | 1.5 | 1.4 | | | | | | |
| Cobalt | <0.2 | <0.2 | | | | | | |
| Copper | 0.05 | <0.02 | | | | | | |
| Iron | 5.1 | 4.9 | | | | | | |
| Lead | <0.05 | <0.05 | | | | | | |
| Manganese | 0.12 | 0.11 | | | | | | |
| Mercury | <0.005 | <0.005 | | | | | | |
| Nickel | 2.0 | 0.72 | | | | | | |
| Selenium | 0.020 | <0.010 | | | | | | |
| Tellurium | <0.3 | <0.3 | | | | | | |
| Tin | <1 | <1 | | | | | | |
| Titanium | <1 | <1 | | | | | | |
| Vanadium | <0.1 | <0.1 | | | | | | |
| Zinc | 4.9 | 0.10 | | | | | | |
| Chloride | 27.2 | 26.0 | | | | | | |
| Fluoride | 0.40 | 0.44 | | | | | | |
| Nitrates | — | — | | | | | | |
| Sulfates | — | — | | | | | | |

665,624,
673,635,
630,519,
631,636,
686,637,
632

**COMMERCIAL TESTING & ENGINEERING CO.**
GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434
Reply to INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST 44TH AVENUE, GOLDEN, COLORADO 80401, PHONE: 303-278-9521

To: Mr. John C. Michalovic
Calspan Corporation
Post Office Box 235
Buffalo, NY 14221

Date: July 1, 1977

Analyst: S. Sweeney

P. O. No.: 27810

Sample No.: Test 19-3 D 722, 723, 726, 539

IAD No.: 97-A345-134-21

CONCENTRATION IN PPM WEIGHT

| ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. |
|---|---|---|---|---|---|---|---|
| Uranium | 2 | Terbium | 0.2 | Ruthenium | | Vanadium | MC |
| Thorium | ≤1 | Gadolinium | 0.7 | Molybdenum | 970 | Titanium | 300 |
| Bismuth | | Europium | 0.3 | Niobium | 0.7 | Scandium | 0.2 |
| Lead | 160 | Samarium | 2 | Zirconium | 7 | Calcium | MC |
| Thallium | | Neodymium | 12 | Yttrium | 2 | Potassium | MC |
| Mercury | NR | Praseodymium | 7 | Strontium | 42 | Chlorine | 160 |
| Gold | | Cerium | 19 | Rubidium | 0.8 | Sulfur | >800 |
| Platinum | | Lanthanum | 60 | Bromine | 2 | Phosphorus | MC |
| Iridium | | Barium | 460 | Selenium | 3 | Silicon | MC |
| Osmium | | Cesium | 0.8 | Arsenic | 7 | Aluminum | >130 |
| Rhenium | | Iodine | 1 | Germanium | 0.6 | Magnesium | MC |
| Tungsten | ≤0.7 | Tellurium | 0.8 | Gallium | 11 | Sodium | >330 |
| Tantalum | | Antimony | *20 | Zinc | 570 | Fluorine | ≈46 |
| Hafnium | | Tin | 5 | Copper | 70 | Oxygen | NR |
| Lutetium | | Indium | STD | Nickel | MC | Nitrogen | NR |
| Ytterbium | | Cadmium | 0.4 | Cobalt | 400 | Carbon | NR |
| Thulium | | Silver | 5 | Iron | MC | Boron | 1 |
| Erbium | 0.2 | Palladium | | Manganese | 44 | Beryllium | 0.1 |
| Holmium | 0.4 | Rhodium | | Chromium | 33 | Lithium | 2 |
| Dysprosium | 0.8 | | | | | Hydrogen | NR |

*Heterogeneous
NR – Not Reported
All elements not reported <0.1 ppm weight

Approved: M Jacobs

**COMMERCIAL TESTING & ENGINEERING CO.**
GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434
Reply to INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST 44TH AVENUE, GOLDEN, COLORADO 80401, PHONE: 303-278-9521

To: Mr. John C. Michalovic
Calspan Corporation
P. O. Box 235
Buffalo, NY 14221

Date: July 1, 1977

Analyst: S. Sweeney

P. O. No.:

Sample No.: Test 19-3 E 537

IAD No.: 97-A345-134-21

CONCENTRATION IN PPM WEIGHT

| ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. |
|---|---|---|---|---|---|---|---|
| Uranium | ≤1 | Terbium | | Ruthenium | | Vanadium | 0.6 |
| Thorium | ≤1 | Gadolinium | | Molybdenum | *18 | Titanium | 2 |
| Bismuth | | Europium | | Niobium | | Scandium | ≤0.1 |
| Lead | 1 | Samarium | | Zirconium | 1 | Calcium | 25 |
| Thallium | | Neodymium | | Yttrium | | Potassium | 20 |
| Mercury | NR | Praseodymium | | Strontium | 0.1 | Chlorine | 21 |
| Gold | 1 | Cerium | 0.2 | Rubidium | <0.1 | Sulfur | 21 |
| Platinum | | Lanthanum | 0.4 | Bromine | 1 | Phosphorus | 11 |
| Iridium | | Barium | 0.4 | Selenium | ≤0.4 | Silicon | 45 |
| Osmium | | Cesium | ≤0.1 | Arsenic | 1 | Aluminum | 3 |
| Rhenium | | Iodine | 0.3 | Germanium | | Magnesium | 16 |
| Tungsten | | Tellurium | | Gallium | ≤0.1 | Sodium | 47 |
| Tantalum | | Antimony | 17 | Zinc | 3 | Fluorine | ≃26 |
| Hafnium | | Tin | 0.4 | Copper | 4 | Oxygen | NR |
| Lutetium | | Indium | STD | Nickel | 3 | Nitrogen | NR |
| Ytterbium | | Cadmium | ≤0.3 | Cobalt | <0.1 | Carbon | NR |
| Thulium | | Silver | 0.7 | Iron | 10 | Boron | 4 |
| Erbium | | Palladium | | Manganese | 0.2 | Beryllium | |
| Holmium | | Rhodium | | Chromium | 5 | Lithium | <0.1 |
| Dysprosium | | | | | | Hydrogen | NR |

NR — Not Reported
All elements not reported <0.2ppm weight

Approved:

*Heterogeneous Sample was thermally ashed @350° C for one hour in a laboratory furnace in a quartz crucible prior to analysis.

**COMMERCIAL TESTING & ENGINEERING CO.**
GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434
Reply to INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST 44TH AVENUE, GOLDEN, COLORADO 80401, PHONE: 303-278-9521

To: Mr. John C. Michalovic
Calspan Corporation
Post Office Box 235
Buffalo, NY 14221

Date: July 5, 1977

Analyst: S. Sweeney

P. O. No.: 27810

Sample No.: Test 19-3 F Composite B & C 5/18/77

IAD No.: 97-A345-134-21

CONCENTRATION IN µg/ml

| ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. |
|---|---|---|---|---|---|---|---|
| Uranium | 0.1 | Terbium | | Ruthenium | | Vanadium | 0.02 |
| Thorium | ≤0.06 | Gadolinium | | Molybdenum | 0.3 | Titanium | 2 |
| Bismuth | | Europium | | Niobium | ≤0.02 | Scandium | ≤0.009 |
| Lead | 0.05 | Samarium | | Zirconium | 0.04 | Calcium | MC |
| Thallium | | Neodymium | | Yttrium | ≤0.008 | Potassium | MC |
| Mercury | NR | Praseodymium | | Strontium | 1 | Chlorine | 8 |
| Gold | ≤0.02 | Cerium | 0.01 | Rubidium | 0.003 | Sulfur | MC |
| Platinum | | Lanthanum | 0.03 | Bromine | 0.3 | Phosphorus | MC |
| Iridium | | Barium | 2 | Selenium | 0.4 | Silicon | 3 |
| Osmium | | Cesium | 0.03 | Arsenic | 0.02 | Aluminum | >7 |
| Rhenium | | Iodine | 0.02 | Germanium | | Magnesium | MC |
| Tungsten | | Tellurium | | Gallium | ≤0.006 | Sodium | MC |
| Tantalum | | Antimony | 0.1 | Zinc | 2 | Fluorine | ≈0.3 |
| Hafnium | | Tin | ≤0.03 | Copper | 0.4 | Oxygen | NR |
| Lutetium | | Indium | STD | Nickel | 1 | Nitrogen | NR |
| Ytterbium | | Cadmium | ≤0.01 | Cobalt | 0.01 | Carbon | NR |
| Thulium | | Silver | MC | Iron | 4 | Boron | 0.002 |
| Erbium | | Palladium | | Manganese | 0.2 | Beryllium | 0.001 |
| Holmium | | Rhodium | | Chromium | 2 | Lithium | 0.04 |
| Dysprosium | | | | | | Hydrogen | NR |

NR – Not Reported
All elements not reported <0.006 µg/ml

Approved:

**COMMERCIAL TESTING & ENGINEERING CO.**
GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434
Reply to INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST 44TH AVENUE, GOLDEN, COLORADO 80401, PHONE 303-278-9521

To: Mr. John C. Michalovic
Calspan Corporation
Post Office Box 235
Buffalo, NY 14221

Date: July 14, 1977

Analyst: S. Sweeney

P. O. No.: 27810

Sample No.: Test 19-3 G LF #6 Fuel Oil 5/18/77

IAD No.: 97-A345-134-21

CONCENTRATION IN PPM WEIGHT

| ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. |
|---|---|---|---|---|---|---|---|
| Uranium | | Terbium | | Ruthenium | | Vanadium | 140 |
| Thorium | | Gadolinium | | Molybdenum | 8 | Titanium | 1 |
| Bismuth | | Europium | | Niobium | ≤0.4 | Scandium | ≤0.2 |
| Lead | ≤1 | Samarium | | Zirconium | 0.6 | Calcium | 48 |
| Thallium | | Neodymium | | Yttrium | | Potassium | 8 |
| Mercury | NR | Praseodymium | | Strontium | 1 | Chlorine | 2 |
| Gold | | Cerium | | Rubidium | ≤0.1 | Sulfur | MC |
| Platinum | | Lanthanum | | Bromine | ≤0.5 | Phosphorus | 11 |
| Iridium | | Barium | 6 | Selenium | 1 | Silicon | 19 |
| Osmium | | Cesium | | Arsenic | 0.5 | Aluminum | 2 |
| Rhenium | | Iodine | | Germanium | | Magnesium | 27 |
| Tungsten | | Tellurium | | Gallium | | Sodium | 72 |
| Tantalum | | Antimony | | Zinc | 2 | Fluorine | ≈4 |
| Hafnium | | Tin | | Copper | 2 | Oxygen | NR |
| Lutetium | | Indium | STD | Nickel | 26 | Nitrogen | NR |
| Ytterbium | | Cadmium | | Cobalt | 2 | Carbon | NR |
| Thulium | | Silver | 2 | Iron | 13 | Boron | 0.7 |
| Erbium | | Palladium | | Manganese | 0.6 | Beryllium | |
| Holmium | | Rhodium | | Chromium | 3 | Lithium | ≤0.1 |
| Dysprosium | | | | | | Hydrogen | NR |

NR — Not Reported
All elements not reported <0.2 ppm weight

Approved:

Sample was thermally ashed @ 350° C for one hour in a laboratory furnace in a quartz crucibl
prior to analysis

**COMMERCIAL TESTING & ENGINEERING CO.**
GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434
Reply to INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST 44TH AVENUE, GOLDEN, COLORADO 80401, PHONE 303-278-9521

To: Mr. John C. Michalovic
Calspan Corporation
Post Office Box 235
Buffalo, NY 14221

Date: July 14, 1977

Analyst: S. Sweeney

P. O. No.: 27810

Sample No.: Test 19-3 G LF #6 Fuel Oil Duplicate
5-18-77

IAD No.: 97-A345-134-21

CONCENTRATION IN PPM WEIGHT

| ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. |
|---|---|---|---|---|---|---|---|
| Uranium | | Terbium | | Ruthenium | | Vanadium | 150 |
| Thorium | | Gadolinium | | Molybdenum | 10 | Titanium | 1 |
| Bismuth | | Europium | | Niobium | ≤0.2 | Scandium | ≤0.1 |
| Lead | ≤0.8 | Samarium | | Zirconium | 0.6 | Calcium | 38 |
| Thallium | | Neodymium | | Yttrium | | Potassium | 16 |
| Mercury | NR | Praseodymium | | Strontium | 0.8 | Chlorine | 0.9 |
| Gold | | Cerium | | Rubidium | 0.04 | Sulfur | MC |
| Platinum | | Lanthanum | | Bromine | | Phosphorus | 8 |
| Iridium | | Barium | 2 | Selenium | 0.8 | Silicon | 17 |
| Osmium | | Cesium | | Arsenic | 0.3 | Aluminum | 1 |
| Rhenium | | Iodine | | Germanium | | Magnesium | 17 |
| Tungsten | | Tellurium | | Gallium | | Sodium | 50 |
| Tantalum | | Antimony | | Zinc | 3 | Fluorine | ≈2 |
| Hafnium | | Tin | | Copper | 1 | Oxygen | NR |
| Lutetium | | Indium | STD | Nickel | 20 | Nitrogen | NR |
| Ytterbium | | Cadmium | | Cobalt | 2 | Carbon | NR |
| Thulium | | Silver | ≤0.2 | Iron | 15 | Boron | 0.8 |
| Erbium | | Palladium | | Manganese | 0.3 | Beryllium | |
| Holmium | | Rhodium | | Chromium | 0.2 | Lithium | ≤0.1 |
| Dysprosium | | | | | | Hydrogen | NR |

NR – Not Reported
All elements not reported <0.2 ppm weight

Approved:

Sample was thermally ashed @ 350°C for one hour in a laboratory furnace in a quartz crucible prior to analysis.

KVB Analysis Data (Cont.)

| Test | Sample Number | POM's | PCB's |
|---|---|---|---|
| 19-3 | 537 | < 0.1 ug/g | < 1 ug/g |
| | 537 (duplicate) | < 0.1 ug/g | < 1 ug/g |
| | 722 | < 1 ug/g | < 1 ug/g |
| | B | — 1450 ug/l | < 1 ug/l |
| | C | 2 ug/l | < 1 ug/l |
| | LF | * | * |
| | LF (duplicate) | * | * |

*Sample extracts too concentrated to be able to determine an analytical value.

# KVB

## TRACE SPECIES AND ORGANICS TEST
## SAMPLE RECOVERY LOG

Test No. 19-4SASS Date 3-23-77 Location 19

Sample Port Position STACK CENTER 15" in

| Container Number | Sample Description | Container Type | Net wt/vol. | Comment |
|---|---|---|---|---|
| 728 | NOZ/PROBE/10 m | NAL | 1.5802 | SOLIDS |
| 645 | " | GL | 215 | 50/50 |
| 646 | " | GL | 210 | " |
| 649 | " | GL | 230 | $H_2O$ |
| 650 | " | GL | 225 | " |
| 732 | 3 m | NAL | .9878 | SOLIDS |
| 651 | " | GL | 190 | 50/50 |
| 652 | " | GL | 165 | $H_2O$ |
| 734 | 1 m | NAL | .3263 | SOLIDS |
| 654 | " | GL | 165 | 50/50 |
| 655 | " | GL | 150 | $H_2O$ |
| 540 | FILTER | P. DISH | .9503 | SOLIDS |
| 656 | " | GL | 125 | 50/50 |
| 657 | " | GL | 85 | $H_2O$ |
| 695 | #1 IMPINGER | NAL | 890 | SOLUTION |
| 658 | " | GL | 165 | IPA |
| 660 | " | GL | 180 | $H_2O$ |
| 696 | #2 IMPINGER | NAL | 875 | SOLUTION |
| 661 | " | GL | 170 | IPA |
| 662 | " | GL | 180 | $H_2O$ |
| 698 | #3 IMPINGER | NAL | 605 | SOLUTION |
| 663 | " | GL | 80 | IPA |
| 664 | " | GL | 140 | $H_2O$ |
| 535 | XAD-2 | GL | — | RESIN |
| 697 | " | NAL | 1000 | CONDENSATE |
| 648 | " | GL | 175 | " |
| 581 | " | GL | 230 | 50/50 |
| 582 | " | GL | 305 | $H_2O$ |

KEELER BOILER

TEST 19-4 TABLE STACK - #6 OIL LOW $NO_x$ COND.

| POLLUTANT | SAMPLE NUMBER | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | $728^+$ | $732^+$ | $734^+$ | $540^+$ | A* | B* | $535^+$ | $C_1$* |
| Antimony | <50 | <100 | <125 | <100 | <0.5 | <0.5 | <22 | |
| Arsenic | 20 | 20 | 50 | 46.3 | 0.005 | <0.005 | 6.2 | |
| Barium | 140 | 2400 | 625 | 652 | <0.1 | <0.1 | 85 | |
| Beryllium | <1.0 | <2.0 | <2.5 | <2 | <0.005 | <0.005 | <0.45 | |
| Cadmium | <1.0 | <2.0 | <2.5 | <2 | <0.005 | 0.040 | <0.45 | |
| Calcium | 2000 | 840 | 4700 | <60000 | 0.35 | 0.12 | <4.5 | |
| Chromium | 37 | 56 | 115 | 109 | 0.10 | 8.3 | 6.2 | |
| Cobalt | 95 | 110 | 270 | <24 | <0.2 | <0.2 | 3.1 | |
| Copper | 28 | 30 | 33 | 156 | 0.05 | 0.54 | 7.6 | |
| Iron | 2700 | 2440 | 8600 | 11600 | 1.2 | 46 | 29 | |
| Lead | — | — | — | — | <0.05 | <0.05 | — | |
| Manganese | 30 | 34 | 73 | 114 | 0.16 | 0.62 | 1.3 | |
| Mercury | <0.04 | <0.08 | <0.1 | <0.08 | <0.005 | <0.005 | <0.02 | |
| Nickel | 1000 | 1320 | 8800 | 12600 | 1.1 | 20 | <2.2 | |
| Selenium | <2.0 | <4.0 | <5.0 | <4 | <0.01 | <0.01 | <0.89 | |
| Tellurium | <50 | <100 | <125 | <100 | <0.3 | <0.3 | <22 | |
| Tin | <100 | <200 | <250 | <250 | <1 | <1 | <45 | |
| Titanium | <300 | <600 | <750 | ~420 | <1 | <1 | <130 | |
| Vanadium | <20 | 5800 | 14000 | 36800 | 1.1 | <0.1 | <0.89 | |
| Zinc | 3.0 | 174 | 300 | 2170 | 2.7 | 27 | 5.4 | |
| Chloride | <28 | <53 | — | 446 | <0.5 | <0.5 | 30.0 | — |
| Fluoride | — | 274 | 323 | <1 | <0.1 | 0.17 | 25 | — |
| Nitrates | 49.5 | 35.0 | — | <20 | 0.16 | 0.76 | 1.87 | 0.28 |
| Sulfates | 7890 | 12700 | — | 199000 | 10 | 212 | 449 | 16500 |
| | | | | | 645,646,<br>649,650,<br>651,652,<br>654,655,<br>656,657 | 581,<br>582 | | 697,648,<br>695,658,<br>660 |

KEELER BOILER

TEST 19-4 TABLE STACK - #6 OIL LOW $NO_x$ COND.

| POLLUTANT | SAMPLE NUMBER | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | C* | | | | | | | |
| Antimony | <0.5 | | | | | | | |
| Arsenic | <0.005 | | | | | | | |
| Barium | <0.1 | | | | | | | |
| Beryllium | <0.005 | | | | | | | |
| Cadmium | <0.005 | | | | | | | |
| Calcium | 0.77 | | | | | | | |
| Chromium | 1.2 | | | | | | | |
| Cobalt | <0.2 | | | | | | | |
| Copper | 0.08 | | | | | | | |
| Iron | 3.1 | | | | | | | |
| Lead | <0.05 | | | | | | | |
| Manganese | 0.08 | | | | | | | |
| Mercury | <0.005 | | | | | | | |
| Nickel | 3.2 | | | | | | | |
| Selenium | <0.010 | | | | | | | |
| Tellurium | <0.3 | | | | | | | |
| Tin | <1 | | | | | | | |
| Titanium | <1 | | | | | | | |
| Vanadium | <0.1 | | | | | | | |
| Zinc | 9.7 | | | | | | | |
| Chloride | 41.0 | | | | | | | |
| Fluoride | 0.10 | | | | | | | |
| Nitrates | — | | | | | | | |
| Sulfates | — | | | | | | | |

697,648,
695,658,
660,696,
661,662,
698,663,
664

KVB Analysis Data (Cont.)

| Test | Sample Number | POM's | PCB's |
|---|---|---|---|
| 19-4 | 535<br>LF | < 0.1 ug/g<br>* | < 1 ug/g<br>* |

*Sample extracts too concentrated to be able to determine an analytical value.

POM QUANTIFICATION

| Component | Blank 684 | Blank-K 571 | Test 19-2 #533 | Test 19-3 #537 |
|---|---|---|---|---|
| Anthracene | 0.71 ng | 10.0 ng | 367 ng | 57.8 ng |
| Phenanthrene | -- | -- | -- | 2.3 |
| Methyl Anthracenes | -- | 1.9 | 24.1 | 15.4 |
| Fluoranthene | 0.21 | 1.0 | 136 | 16.3 |
| Pyrene | -- | -- | 6.1 | 6.3 |
| Benzo(c)phenanthrene | -- | -- | 0.26 | -- |
| Chrysene | -- | -- | 2.9 | 0.52 |
| Benz(a)anthracene | -- | -- | -- | -- |
| Methyl Chrysenes | -- | -- | -- | -- |
| Benzo Fluoranthenes | -- | -- | 0.80 | 0.87 |
| Benz(a)pyrene | -- | -- | 0.48 | -- |
| Benz(e)pyrene | -- | -- | 0.49 | -- |
| Perylene | -- | -- | -- | -- |
| Indeno(1,2,3-cd)pyrene | -- | -- | -- | -- |
| Benzo(ghi)perylene | -- | -- | -- | -- |

INDUSTRIAL BOILER DESIGN DATA

Location No. 38

Unit No.

Unit Description

VERTICAL CE WATERTUBE BOILER

| | |
|---|---|
| Steam Output (lb/hr x $10^3$) | 45 |
| Final Steam Temp., °F | SATURATED |
| Burner Description | 1 PEABODY GAS RING |
| Test Fuel | NATURAL GAS ; #6 OIL |
| Primary Air Temp, °F | ~350 |
| Stack Temp, °F | 430-550 |

Comments:

THE UNIT WAS MODIFIED TO INCORPORATE SIDEFIRE CAPABILITY.

**MOBILE LABORATORY DATA**

Test No.________

Test No. 200-23,24 Date 5/24/76 Location 38 Engr.________

Unit No.________ Fuel NO. 6 Capacity 45 K#/hr

FURNACE ~~Unit~~ Type C.E. VERTICAL Burner Type PEABODY STEAM

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | 200-23 | | | 200-24 | | | | | |
| 2. Date | | | | | | | | | |
| 3. Time | | | | | | | | | |
| 4. Load K#/hr | 38 | | | 38 | | | | | |
| 5. Process Rate | | | | | | | | | |
| 6. Flue Diam. or Size, ft | | | | | | | | | |
| 7. Probe Position | | | | | | | | | |
| 8. Oxygen (%) HOT/COLD | 2.95 | 2.9 | | 2.9 | 2.9 | | | | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | | | | 271 | 297 | | | | |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 245 | 268 | | 270 | 296 | | | | |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | | | | 1 | 1 | | | | |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 300 | 298 | | 298 | 296 | | | | |
| 13. Carbon Dioxide (%) (BOILER EXIT) | 13.8 | | | 13.8 | | | | | |
| 14. Carbon Monoxide (ppm) uncor/cor* | | | | | | | | | |
| 15. Hydrocarbon (ppm) uncor/cor* | | | | | | | | | |
| 16. Sulfur Dioxide (ppm) uncor/cor* | | | | | | | | | |
| 17. Smoke Spot (Bacharach) | | | | | | | | | |
| 18. Atmos. Temp. (°F/°C) DRY/WET | 70/56 | | | 70/57 | | | | | |
| 19. Dew Point Temp. (°F/°C) | | | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | 29.8 | | | 29.75 | | | | | |
| 21. Relative Humidity (%) | | | | | | | | | |
| 22. STACK $O_2$ | 6.8 | | | 6.75 | | | | | |
| 23. WATER CONTENT (% VOL.) | 10 | | | 10 | | | | | |
| 24. NO STACK | 233 | 295 | | 245 | 309 | | | | |
| 25. CO HOT/COLD/STACK | – | 258 | – | 22 | 22 | 16 | | | |
| 26. | | | | | | | | | |
| 27. | | | | | | | | | |
| 28. | | | | | | | | | |
| 29. | | | | | | | | | |
| 30. | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.

Test No. Date 5/25/76 Location 38 Engr.

Unit No. Fuel NO. 6 Capacity 45 K#/hr

Unit Type C.E. VERTICAL Burner Type PEABODY STEAM

| | | | | | |
|---|---|---|---|---|---|
| 1. Test No. | 200-25 | 201-12 | 202-4 | 202-4A | |
| 2. Date | | | | | |
| 3. Time | | | | | |
| 4. Load | | | | | |
| 5. Process Rate | | | | | |
| 6. Flue Diam. or Size, ft | | | | | |
| 7. Probe Position | | | | | |
| 8. Oxygen (%) HOT / COLD | 2.9 2.8 | 1.55 1.55 | 2.6 | 2.65 2.7 | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 260 285 | 232 238 | | 185 200 | |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 260 285 | 232 238 | | 185 200 | |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 0 0 | 0 0 | | 0 0 | |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 288 285 | 245 227 | 265 259 | 230 226 | |
| 13. Carbon Dioxide (%) BOILER EXIT | 14.0 | 15.0 | 14.1 | 14.1 | |
| 14. Carbon Monoxide (ppm) uncor/cor* | | | | | |
| 15. Hydrocarbon (ppm) uncor/cor* | | | | | |
| 16. Sulfur Dioxide (ppm) uncor/cor* | | | | | |
| 17. Smoke Spot (Bacharach) | | | | | |
| 18. Atmos. Temp. (°F/°C) DRY/WET | 58 51 | 59 51 | | 58 52 | |
| 19. Dew Point Temp. (°F/°C) | | | | | |
| 20. Atmos. Pressure (in. Hg) | | 29.93 | | | |
| 21. Relative Humidity (%) | | | | | |
| 22. STACK $O_2$ | 6.7 | 5.7 | 6.2 | 6.4 | |
| 23. WATER CONTENT (% VOL.) | 10 | 10.7 | | 10.1 | |
| 24. NO STACK | 220 277 | 188 221 | 220 268 | 185 228 | |
| 25. CO HOT COLD STACK | 26 22 16 | 46-[illegible] 60 [illegible]-120 80 | 30 | 55 32 29 | |
| 26. | | | | | |
| 27. | | | | | |
| 28. | | | | | |
| 29. | | | | | |
| 30. | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

**MOBILE LABORATORY DATA** Test No.________

Test No.________ Date 5/26/76 Location 38 Engr.________

Unit No.________ Fuel NO. 6 Capacity 45 K#/hr

Unit Type C.E. VERTICAL Burner Type PEABODY STEAM

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | 200-26 | | 201-13 | | 201-14 | | 202-5 | | | |
| 2. Date | | | | | | | | | | |
| 3. Time | | | | | | | | | | |
| 4. Load | | | | | | | | | | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | | | | | | | | | | |
| 7. Probe Position | | | | | | | | | | |
| 8. Oxygen (%) HOT /COLD | | 2.4 | | 1.6 | | 1.5 | 2.55 | 2.45 | | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | | | | | | | 225 | 242 | | |
| 10. NO (hot) read/3% $O_2$ (ppm)* | | | | | | | 220 | 237 | | |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | | | | | | | 5 | 5 | | |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 277 | 268 | 250 | 232 | 248 | 229 | 235 | 228 | | |
| 13. Carbon Dioxide (%) BOILER EXIT | | | 15 | | 15 | | 14.4 | | | |
| 14. Carbon Monoxide (ppm) uncor/cor* | | | | | | | | | | |
| 15. Hydrocarbon (ppm) uncor/cor* | | | | | | | | | | |
| 16. Sulfur Dioxide (ppm) uncor/cor* | | | | | | | | | | |
| 17. Smoke Spot (Bacharach) | | | | | | | | | | |
| 18. Atmos. Temp. (°F/°C) DRY/WET | | | 58 | 52 | | | 67 | 56 | | |
| 19. Dew Point Temp. (°F/°C) | | | | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | | | 30.05 | | | | 29.87 | | | |
| 21. Relative Humidity (%) | | | | | | | | | | |
| 22. STACK $O_2$ | 6.5 | | 5.8 | | 6.05 | | 6.4 | | | |
| 23. WATER CONTENT (% VOL) | | | | | | | 10.2 | | | |
| 24. NO (STACK) | 227 | 282 | 195 | 231 | 195 | 235 | 140 | 173 | | |
| 25. | | | | | | | | | | |
| 26. | | | | | | | | | | |
| 27. | | | | | | | | | | |
| 28. | | | | | | | | | | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No.________ Date 5/27/76 Location 38 Engr.________

Unit No.________ Fuel NO. 6 Capacity 45 K#/hr

Unit Type C.E. VERTICAL Burner Type PEABODY STEAM

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | 200-27 | | 201-15 | | 203-28 | | | | | |
| 2. Date | | | | | | | | | | |
| 3. Time | | | | | | | | | | |
| 4. Load | | | | | | | | | | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | | | | | | | | | | |
| 7. Probe Position | | | | | | | | | | |
| 8. Oxygen (%) HOT / COLD | 2.3 | 2.3 | 1.55 | 1.6 | 3.3 | 3.35 | | | | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 175 | 185 | 220 | 226 | 155 | 173 | | | | |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 172 | 182 | 220 | 226 | 155 | 173 | | | | |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 3 | 3 | 0 | 0 | 0 | 0 | | | | |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 290 | 279 | 270 | 251 | 180 | 184 | | | | |
| 13. Carbon Dioxide (%) BOILER EXIT | 14.6 | | 15.0 | | 13.2 | | | | | |
| 14. Carbon Monoxide (ppm) uncor/cor* | | | | | | | | | | |
| 15. Hydrocarbon (ppm) uncor/cor* | | | | | | | | | | |
| 16. Sulfur Dioxide (ppm) uncor/cor* | | | | | | | | | | |
| 17. Smoke Spot (Bacharach) | | | | | | | | | | |
| 18. Atmos. Temp. (°F/°C) DRY / WET | | | 65 | 57 | 75 | 60 | | | | |
| 19. Dew Point Temp. (°F/°C) | | | | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | | | 30.10 | | 30.16 | | | | | |
| 21. Relative Humidity (%) | | | | | | | | | | |
| 22. STACK $O_2$ | 6.25 | | 5.85 | | 7.0 | | | | | |
| 23. WATER CONTENT (% VOL.) | 10.3 | | 10.7 | | 9.8 | | | | | |
| 24. NO (STACK) | 135 | 165 | 209 | 248 | 147 | 189 | | | | |
| 25. | | | | | | | | | | |
| 26. | | | | | | | | | | |
| 27. | | | | | | | | | | |
| 28. | | | | | | | | | | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

## MOBILE LABORATORY DATA

Test No.________

Test No. 2006-1,2 2016-1,2,3 Date 6-01-76 6-02-76 Location 38 Engr. WN, T.D.

Unit No. ________ Fuel GAS Capacity 45 K#/hr

Unit Type C.E. VERTICAL Burner Type PEABODY - RING

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | 2006-1 | | | 2006-2 | | | 2016-1 | | | 2016-2 | | | 2016-3 | | |
| 2. Date | | | | 6/02/76 | | | | | | | | | | | |
| 3. Time | | | | | | | | | | | | | | | |
| 4. Load (k#/hr) | 41.5 | | | 40.0 | | | 40.0 | | | 40.0 | | | 39.8 | | |
| 5. Process Rate | | | | | | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | | | | | | | | | | | | | | | |
| 7. Probe Position | | | | | | | | | | | | | | | |
| 8. Oxygen (%) COLD LINE/HEATED LINE | 1.25 | 1.40 | | 1.6 | 1.5 | | 4.0 | 4.1 | | 2.5 | 2.5 | | 3.95 | | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 144 | | | 162 | | | 148 | | | 165 | | | | | |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 144 | | | 162 | | | 148 | | | 164 | | | | | |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 0 | | | 0 | | | 0 | | | 1 | | | | | |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 157 | 143 | | 174 | 161 | | 160 | 169 | | 180 | 175 | | 162 | | |
| 13. Carbon Dioxide (%) | 11 | | | 10.5 | | | 9.5 | | | 10 | | | | | |
| 14. Carbon Monoxide (ppm) uncor/cor* | | | | | | | | | | | | | | | |
| 15. Hydrocarbon (ppm) uncor/cor* | | | | | | | | | | | | | | | |
| 16. Sulfur Dioxide (ppm) uncor/cor* | | | | | | | | | | | | | | | |
| 17. Smoke Spot (Bacharach) | | | | | | | | | | | | | | | |
| 18. Atmos. Temp. (°F/°C) DRY/WET | 66 | 65 | | 58.5 | 55 | | 64 | 56 | | 66 | 57.5 | | | | |
| 19. Dew Point Temp. (°F/°C) | | | | | | | | | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | 29.85 | | | 30.04 | | | 30.15 | | | 30.16 | | | | | |
| 21. Relative Humidity (%) | | | | | | | | | | | | | | | |
| 22. STACK $O_2$ | 5.8 | | | 6.2 | | | 8.0 | | | 6.6 | | | 7.75 | | |
| 23. NO (STACK) | 122 | 144 | | 131 | 159 | | 122 | 169 | | 138 | 172 | | 124 | | |
| 24. CO COLD LINE/HOT LINE/STACK | | | | | | | | | | 12 | 12 | 10 | 20 | - | 11 |
| 25. $CO_2$ COLD LINE/HOT LINE STACK | 11.0 | 11.0 | 8.3 | 10.5 | 10.5 | 7.8 | 9.5 | 9.5 | 7.1 | 10 | 10 | 7.4 | | | |
| 26. | | | | | | | | | | | | | | | |
| 27. | | | | | | | | | | | | | | | |
| 28. | | | | | | | | | | | | | | | |
| 29. | | | | | | | | | | | | | | | |
| 30. | | | | | | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

## MOBILE LABORATORY DATA

Test No.________

Test No. 2016-4,5,6 Date 6-2-76 Location 3 8 Engr.________

Unit No.________ Fuel GAS Capacity 45 k#/hr

Unit Type C.E. VERTICAL Burner Type PEABODY - RING

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | 2016-4 | | 2016-5 | | 2016-6 | | | | | |
| 2. Date | | | | | | | | | | |
| 3. Time | | | | | | | | | | |
| 4. Load (k#/hr) | 40.0 | | 39.2 | | 40.5 | | | | | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | | | | | | | | | | |
| 7. Probe Position | | | | | | | | | | |
| 8. Oxygen (%) COLD LINE/HOT LINE | 2.9 | 2.9 | 1.25 | | 1.45 | 1.50 | | | | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 156 | | | | 148 | | | | | |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 156 | | | | 148 | | | | | |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 0 | | | | 0 | | | | | |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 166 | 165 | 152 | 139 | 164 | 151 | | | | |
| 13. Carbon Dioxide (%) | 10 | | 10.5 | | 11.0 | | | | | |
| 14. Carbon Monoxide (ppm) uncor/cor* | | | | | | | | | | |
| 15. Hydrocarbon (ppm) uncor/cor* | | | | | | | | | | |
| 16. Sulfur Dioxide (ppm) uncor/cor* | | | | | | | | | | |
| 17. Smoke Spot (Bacharach) | | | | | | | | | | |
| 18. Atmos. Temp. (°F/°C) DRY/WET | 68 | 58 | | | | | | | | |
| 19. Dew Point Temp. (°F/°C) | | | | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | 30.15 | | | | | | | | | |
| 21. Relative Humidity (%) | | | | | | | | | | |
| 22. STACK $O_2$ | 7.0 | | 5.85 | | 6.0 | | | | | |
| 23. NO (STACK) | 129 | 166 | 114 | 135 | 124 | 149 | | | | |
| 24. CO COLD LINE / HOT LINE | 10 | 10 | 2000 | | 280 | 130-250 | | | | |
| 25. CO (STACK) | 7 | | 2000 | | 300 | | | | | |
| 26. $CO_2$ COLD LINE HOT LINE | 10 | 10 | 10.5 | | 11.0 | 11.0 | | | | |
| 27. $CO_2$ (STACK) | 7.6 | | 8 | | 8.3 | | | | | |
| 28. | | | | | | | | | | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

**MOBILE LABORATORY DATA**

Test No.________

Test No.________ Date 6/3/76 Location 38 Engr.________

Unit No.________ Fuel GAS Capacity 45 k#/hr

Unit Type C.E. VERTICAL Burner Type PEABODY – RING

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | 2006-3 | | 204-1 | | 204-2 | | 204-3 | | 204-4 | |
| 2. Date | | | | | | | | | | |
| 3. Time | | | | | | | | | | |
| 4. Load (k#/hr) | 39.0 | | 38.0 | | 38.0 | | 38.3 | | 38.5 | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | | | | | | | | | | |
| 7. Probe Position | | | | | | | | | | |
| 8. Oxygen (%) COLD LINE/HOT LINE | 2.7 | 2.7 | 2.95 | 2.80 | 2.6 | 2.6 | 2.9 | 3.05 | 3.0 | 2.95 |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 154 | | 112 | | 114 | | 136 | | 136 | |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 154 | | 112 | | 114 | | 136 | | 134 | |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 0 | | 0 | | 0 | | 0 | | 2 | |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 166 | 163 | 125 | 125 | 130 | 127 | 152 | 151 | 164 | 164 |
| 13. Carbon Dioxide (%) | 10 | | 12.6 | | 12.6 | | 12.6 | | 12.6 | |
| 14. Carbon Monoxide (ppm) uncor/cor* | | | | | | | | | | |
| 15. Hydrocarbon (ppm) uncor/cor* | | | | | | | | | | |
| 16. Sulfur Dioxide (ppm) uncor/cor* | | | | | | | | | | |
| 17. Smoke ~~Spot (Bacharach)~~ NUMBER | 0 | | 1 | | 0 | | 0 | | 0 | |
| 18. Atmos. Temp. (°F/°C) DRY/WET | 53 | 52 | 60.5 | 55 | 67 | 57 | 76 | 69 | 75 | 58 |
| 19. Dew Point Temp. (°F/°C) | | | | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | 30.24 | | 30.24 | | 30.24 | | 30.24 | | 30.23 | |
| 21. Relative Humidity (%) | | | | | | | | | | |
| 22. STACK $O_2$ | 6.9 | | 7.0 | | 6.8 | | 7.0 | | 6.95 | |
| 23. STACK NO | 129 | 165 | 95 | 122 | 103 | 131 | 118 | 152 | 126 | 161 |
| 24. CO COLD LINE/HOT LINE | 8 | 6 | 18 | 16 | 8 | 11 | 6 | 4 | 7 | 8 |
| 25. STACK CO | 4 | | 16 | | 7 | | 4 | | 3 | |
| 26. $CO_2$ COLD LINE/HOT LINE | 10 | 10 | 12.6 | 12.6 | 12.6 | 12.6 | 12.6 | 12.6 | 12.6 | 12.6 |
| 27. STACK $CO_2$ | 7.6 | | 9.8 | | 9.8 | | 9.8 | | 10 | |
| 28. PORTS OPEN | | | SCA PORTS 14+15 | | SCA PORTS 12+13 | | SCA PORTS 10+11 | | SCA PORTS 8+9 | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

## MOBILE LABORATORY DATA

Test No.________

Test No.__________ Date 6/3/76 Location 38 Engr.__________

Unit No.__________ Fuel GAS Capacity 45 k#/hr

Unit Type C.E. VERTICAL Burner Type RING

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | 204-5 | | 204-6 | | 2006-4 | | | | | |
| 2. Date | | | | | | | | | | |
| 3. Time | | | | | | | | | | |
| 4. Load | | | | | | | | | | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | | | | | | | | | | |
| 7. Probe Position | | | | | | | | | | |
| 8. Oxygen (%) COLD LINE/HOT LINE | 2.75 | 2.75 | 2.7 | | 2.7 | 2.8 | | | | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 108 | | | | 136 | | | | | |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 107 | | | | 136 | | | | | |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 1 | | | | 0 | | | | | |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 134 | 132 | 144 | 142 | 179 | 176 | | | | |
| 13. Carbon Dioxide (%) | 12.6 | | 10 | | 10 | | | | | |
| 14. Carbon Monoxide (ppm) uncor/cor* | | | | | | | | | | |
| 15. Hydrocarbon (ppm) uncor/cor* | | | | | | | | | | |
| 16. Sulfur Dioxide (ppm) uncor/cor* | | | | | | | | | | |
| 17. Smoke Spot (Bacharach) | | | | | | | | | | |
| 18. Atmos. Temp. (°F/°C) DRY/WET | 69 | 62 | 69 | 62 | | | | | | |
| 19. Dew Point Temp. (°F/°C) | | | | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | 30.23 | | 30.23 | | | | | | | |
| 21. Relative Humidity (%) | | | | | | | | | | |
| 22. STACK $O_2$ | 6.75 | | 6.75 | | 6.7 | | | | | |
| 23. STACK NO | 103 | 130 | 110 | 139 | 138 | 174 | | | | |
| 24. CO COLD LINE/HOT LINE | 11 | 12 | 26 | | 6 | 6 | | | | |
| 25. STACK CO | 10 | | 35 | | 5 | | | | | |
| 26. $CO_2$ COLD LINE/HOT LINE | 12.6 | 12.6 | 10 | | 10 | 10 | | | | |
| 27. STACK $CO_2$ | 10 | | 7.4 | | 7.6 | | | | | |
| 28. PORTS OPEN | SCA 6 + 7 | | SCA 12 + 13 | | BASELINE | | | | | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA Test No.________

Test No.__________ Date 6-4-76 Location 38 Engr.__________

Unit No.__________ Fuel GAS Capacity 45 k#/hr

Unit Type C.E. VERTICAL Burner Type__________

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | 200-6-5 | | 201-6-7 | | 201-6-8 | | 204-7 | | 204-8 | |
| 2. Date | | | | | | | | | | |
| 3. Time | | | | | | | | | | |
| 4. Load #/hr | 41,000 | | 40,500 | | 40,000 | | 39,500 | | 39,500 | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | | | | | | | | | | |
| 7. Probe Position | | | | | | | | | | |
| 8. Oxygen (%) COLD LINE/HEATED LINE | 2.3 | 2.3 | 2.78 | 2.53 | 3.4 | 3.35 | 2.7 | 2.7 | 2.95 | 3.00 |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 148 | 172 | 156 | 181 | 142 | 172 | 110 | 129 | 109 | 130 |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 148 | 172 | 148 | 172 | 146 | 176 | 108 | 126 | 106 | 126 |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 0 | 0 | 8 | 9 | 0 | 0 | 2 | 3 | 3 | 4 |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 184 | 177 | 186 | 184 | 176 | 180 | 134 | 132 | 140 | 140 |
| 13. Carbon Dioxide (%) | 10.5 | | 10.5 | | 10.0 | | 10.25 | | 10.00 | |
| 14. Carbon Monoxide (ppm) uncor/cor* | | | | | | | | | | |
| 15. Hydrocarbon (ppm) uncor/cor* | | | | | | | | | | |
| 16. Sulfur Dioxide (ppm) uncor/cor* | | | | | | | | | | |
| 17. Smoke ~~Spot (Bacharach)~~ NUMBER | 1 | | | | | | | | | |
| 18. Atmos. Temp. (°F/°C) | 62.5 | | 64 | | 66 | | 75 | | 75 | |
| 19. Dew Point Temp. (°F/°C) | 53.5 | | 55 | | 57 | | 60 | | 60 | |
| 20. Atmos. Pressure (in. Hg) | 30.37 | | 30.37 | | 30.37 | | 30.37 | | 30.37 | |
| 21. Relative Humidity (%) | | | | | | | | | | |
| 22. STACK $O_2$ | 6.5 | | 6.9 | | 7.2 | | 6.9 | | 7.0 | |
| 23. NO (ROOF) / CORR. | 142 | 176 | 144 | 184 | 137 | 179 | 106 | 135 | 108 | 139 |
| 24. CO COLD LINE/HOT LINE | 3 | 5 | 5 | 6 | 6 | 8 | 6 | 6 | 22 | 22 |
| 25. CO (ROOF LINE) | 3 | | 3 | | 6 | | 4 | | 22 | |
| 26. $CO_2$ COLD LINE/HOT LINE | 10.5 | 10.5 | 10.5 | 10.5 | 10.0 | 10.0 | 10.25 | 10.25 | 10.00 | 10.00 |
| 27. $CO_2$ (ROOF LINE) | 8.0 | | 8.0 | | 7.4 | | 7.6 | | 7.6 | |
| 28. WATER CONTENT (% Vol.) | 16.4 | | 16.2 | | 15.5 | | 16.1 | | 15.8 | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

## MOBILE LABORATORY DATA

Test No.

Test No. Date 6/7 Location 38 Engr. W. NAZIMOWITZ

Unit No. Fuel GAS Capacity

Unit Type C.E. VERTICAL Burner Type

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | 200-6-6 | | 204-9 | | 204-10 | | 204-11 | | 204-12 | |
| 2. Date | | | | | | | | | | |
| 3. Time | | | | | | | | | | |
| 4. Load (#/hr) | 39K | | 39K | | 39K | | 39K | | 38.5K | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | | | | | | | | | | |
| 7. Probe Position | | | | | | | | | | |
| 8. Oxygen (%) COLD LINE/HOT LINE | 2.3 | 2.3 | 2.25 | | 2.5 | 2.6 | 2.4 | 2.45 | 2.35 | 2.35 |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 152 | 175 | | | 94 | 110 | 111 | 129 | 94 | 109 |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 152 | 175 | | | 92 | 107 | 111 | 129 | 93 | 108 |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 0 | 0 | | | 2 | 3 | 0 | 0 | 1 | 1 |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 170 | 164 | 114 | 111 | 114 | 111 | 141 | 137 | 118 | 114 |
| 13. Carbon Dioxide (%) | 10.5 | | 10.5 | | 10.25 | | 10.0 | | 10.0 | |
| 14. Carbon Monoxide (ppm) uncor/cor* | | | | | | | | | | |
| 15. Hydrocarbon (ppm) uncor/cor* | | | | | 8 | | 4 | | 8 | |
| 16. Sulfur Dioxide (ppm) uncor/cor* | | | | | | | | | | |
| 17. Smoke ~~Spot (Bacharach)~~ NUMBER | | | | | 0 | | 0 | | 0 | |
| 18. Atmos. Temp. (°F/°C) | 63.5 | | 69 | | 69 | | 78 | | 81 | |
| 19. Dew Point Temp. (°F/°C) | 61.0 | | 63 | | 63 | | 68 | | 68 | |
| 20. Atmos. Pressure (in. Hg) | 30.00 | | | | | | 29.90 | | 29.90 | |
| 21. Relative Humidity (%) | | | | | | | | | | |
| 22. STACK $O_2$ | 6.45 | | 6.4 | | 6.6 | | 6.5 | | 6.5 | |
| 23. WATER CONTENT (% VOL.) | 16.4 | | | | 16.1 | | 16.3 | | 16.4 | |
| 24. NO (ROOF) /CORR | 131 | 179 | 88 | 109 | 88 | 110 | 111 | 138 | 94 | 117 |
| 25. CO COLD LINE/HOT LINE | 35 | 12 | 122 | | 58 | 42 | 11 | 10 | 6 | 6 |
| 26. CO ROOF LINE | 6 | | 100 | | 55 | | 8 | | 5 | |
| 27. $CO_2$ COLD LINE/HOT LINE | 10.5 | 10.5 | 10.5 | 10.5 | 10.25 | 10.00 | 10.0 | 10.0 | 10.0 | 10.0 |
| 28. $CO_2$ ROOF LINE | 7.8 | | 7.8 | | 7.8 | | 7.8 | | 7.8 | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No. 204 Date 5/7/76 Location 38 Engr. W. N. & R. P.

Unit No.________ Fuel GAS Capacity________

Unit Type C.E. VERTICAL Burner Type RING

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | 204-13 | | 204-14 | | 204-15 | | 204-16 | | 204-17 | |
| 2. Date | | | | | | | | | | |
| 3. Time | | | | | | | | | | |
| 4. Load #/hr | 39 K | | 39K | | 39 K | | 38500 | | 38500 | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | | | | | | | | | | |
| 7. Probe Position | | | | | | | | | | |
| 8. Oxygen (%) COLD LINE/HOT LINE | 1.7 | 1.7 | 1.25 | 1.45 | 4.1 | 4.15 | 3.0 | 3.0 | 1.9 | 1.95 |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 105 | 118 | 116 | 129 | 105 | 132 | 106 | 126 | 92 | 105 |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 104 | 117 | 116 | 129 | 103 | 129 | 106 | 126 | 94 | 107 |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 1 | 1 | 0 | 0 | 2 | 3 | 0 | 0 | 0 | 0 |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 135 | 126 | 145 | 132 | 129 | 137 | 128 | 128 | 116 | 109 |
| 13. Carbon Dioxide (%) | 10.5 | | 11.0 | | 9.1 | | 9.75 | | 10.5 | |
| 14. Carbon Monoxide (ppm) uncor/cor* | | | | | | | | | | |
| 15. Hydrocarbon (ppm) uncor/cor* | 7 | | 7 | | 2 | | 3 | | 3 | |
| 16. Sulfur Dioxide (ppm) uncor/cor* | | | | | | | | | | |
| 17. Smoke ~~Spot (Bacharach)~~ NUMBER | 0 | | 0 | | 0 | | 0 | | 0 | |
| 18. Atmos. Temp. (°F/°C) | 83 | | 83 | | | | | | 79 | |
| 19. Dew Point Temp. (°F/°C) | 68 | | 68 | | | | | | 69 | |
| 20. Atmos. Pressure (in. Hg) | 29.9 | | 29.9 | | | | | | 29.9 | |
| 21. Relative Humidity (%) | | | | | | | | | | |
| 22. STACK | 6.0 | | 5.7 | | 7.8 | | 6.95 | | 6.25 | |
| 23. WATER CONTENT (% VOL.) | 16.9 | | 17.2 | | 14.8 | | 15.8 | | 16.8 | |
| 24. NO (ROOF) / CORR. | 104 | 124 | 112 | 132 | 101 | 138 | 100 | 128 | 92 | 142 |
| 25. CO COLD LINE/HOT LINE | 39 | 29 | 216 | 58 | 6 | 6 | 5 | 6 | 66 | 66 |
| 26. CO ROOF LINE | 39 | | 49 | | 3 | | 3 | | 39 | |
| 27. $CO_2$ COLD LINE/HOT LINE | 10.5 | 10.5 | 11.0 | 11.0 | 9.1 | 9.1 | 9.75 | 9.75 | 10.5 | 10.5 |
| 28. $CO_2$ ROOF LINE | 8.3 | | 8.3 | | 7.1 | | 7.4 | | 8.0 | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.________

Test No.________ Date 6-8-76 Location 38 Engr. W. [illegible]

Unit No.________ Fuel GAS Capacity________

Unit Type C.E. VERTICAL Burner Type________

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | 205-1 | | 205-2 | | 205-3 | | 205-4 | | 205-5 | |
| 2. Date | | | | | | | | | | |
| 3. Time | | | | | | | | | | |
| 4. Load #/hr | 40,000 | | 40,000 | | 40,000 | | 40,000 | | 40,000 | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | | | | | | | | | | |
| 7. Probe Position | | | | | | | | | | |
| 8. Oxygen (%) COLD LINE/HOT LINE | 2.25 | 2.55 | 2.2 | 2.25 | 2.45 | 2.45 | 2.2 | 2.15 | 2.55 | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 151 | 175 | 157 | 181 | 165 | 191 | 103 | 117 | | |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 149 | 173 | 156 | 180 | 165 | 191 | 102 | 116 | | |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 2 | 2 | 1 | 1 | 0 | 0 | 1 | 1 | | |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 190 | 185 | 205 | 196 | 205 | 199 | 127 | 122 | 122 | 119 |
| 13. Carbon Dioxide (%) | 10.75 | | 10.5 | | 10.5 | | 10.5 | | | |
| 14. Carbon Monoxide (ppm) uncor/cor* | | | | | | | | | | |
| 15. Hydrocarbon (ppm) uncor/cor* | 5 | | 4 | | 4 | | 2 | | | |
| 16. Sulfur Dioxide (ppm) uncor/cor* | | | | | | | | | | |
| 17. Smoke ~~Spot (Bacharach)~~ NUMBER | 0 | | 1 | | | | 1 | | | |
| 18. Atmos. Temp. (°F/°C) | 74 | | | | 83 | | 86 | | | |
| 19. Dew Point Temp. (°F/°C) | 66 | | | | 66 | | 70 | | | |
| 20. Atmos. Pressure (in. Hg) | 30.02 | | | | 30.00 | | 29.95 | | | |
| 21. Relative Humidity (%) | | | | | | | | | | |
| 22. STACK $O_2$% | 6.55 | | 6.25 | | 6.35 | | 6.05 | | 6.2 | |
| 23. WATER CONTENT (% VOL.) | 16.2 | | 16.5 | | 16.3 | | 16.5 | | | |
| 24. NO (ROOF) / CORR. | 149 | 186 | 159 | 194 | 160 | 197 | 98 | 118 | 96 | 117 |
| 25. CO COLD LINE/HOT LINE | 11 | 11 | 10 | 10 | 12 | 12 | 10 | 8 | 6 | |
| 26. CO ROOF LINE | 10 | | 10 | | 11 | | 8 | | 6 | |
| 27. $CO_2$ COLD LINE/HOT LINE | 10.75 | 10.75 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | |
| 28. $CO_2$ ROOF LINE | 8.3 | | 8.0 | | 8.0 | | 8.3 | | 8.3 | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA

Test No.

Test No. Date 6/8, 6/9 Location 38 Engr. W. NAZIMOWITZ

Unit No. Fuel GAS Capacity

Unit Type CE VERTICAL Burner Type

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 6/9 | | | |
| 1. Test No. | 205-6 | | 205-7 | | 205/4-8 | | 2006-8 | | 2006-9 | |
| 2. Date | | | | | | | | | | |
| 3. Time | | | | | | | | | | |
| 4. Load (#/hr) | 40,500 | | 39,500 | | 38,500 | | 40,000 | | 40,300 | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | | | | | | | | | | |
| 7. Probe Position | | | | | | | | | | |
| 8. Oxygen (%) COLD LINE/HOT LINE | 1.7 | 1.7 | 2.35 | 2.25 | 2.4 | 2.4 | 2.3 | 2.35 | 2.35 | 2.45 |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 104 | 117 | 117 | 134 | 88 | 102 | 152 | 176 | 126 | 146 |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 104 | 117 | 119 | 137 | 88 | 102 | 152 | 176 | 126 | 146 |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 125 | 117 | 154 | 149 | 108 | 105 | 170 | 164 | 144 | 139 |
| 13. Carbon Dioxide (%) | 10.75 | | 10.5 | | 10.5 | | 10.5 | | 10.5 | |
| 14. Carbon Monoxide (ppm) uncor/cor* | | | | | | | | | | |
| 15. Hydrocarbon (ppm) uncor/cor* | | | | | | | | | | |
| 16. Sulfur Dioxide (ppm) uncor/cor* | | | | | | | | | | |
| 17. Smoke ~~Spot (Bacharach)~~ NUMBER | 1 | | | | | | | | | |
| 18. Atmos. Temp. (°F/°C) | | | 86 | | | | 66 | | 69 | |
| 19. Dew Point Temp. (°F/°C) | | | 70 | | | | 63 | | 64 | |
| 20. Atmos. Pressure (in. Hg) | 29.94 | | 29.89 | | 29.87 | | 29.97 | | 29.99 | |
| 21. Relative Humidity (%) | | | | | | | | | | |
| 22. STACK $O_2$ % | 5.55 | | 6.4 | | 6.5 | | 6.45 | | 6.5 | |
| 23. WATER CONTENT (% VOL) | 16.9 | | 16.5 | | 16.4 | | 16.4 | | 16.3 | |
| 24. NO (ROOF) / CORR. | 98 | 114 | 118 | 146 | 84 | 104 | 130 | 161 | 110 | 137 |
| 25. CO COLD LINE/HOT LINE | 16 | 6 | 6 | 5 | 5 | 5 | 19 | 19 | 19 | 20 |
| 26. CO ROOF LINE | 3 | | 4 | | 2 | | 12 | | 12 | |
| 27. $CO_2$ COLD LINE/HOT LINE | 10.75 | 10.75 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 |
| 28. $CO_2$ ROOF LINE | 8.3 | | 7.8 | | 8.0 | | 7.8 | | 7.8 | |
| 29. | | | | | VPH + | | BASELINE | | VARIABLE REGISTER | |
| 30. | | | | | SCA 6+7 | | | | FULL OPEN | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

## MOBILE LABORATORY DATA

Test No.________

Test No.__________ Date 6/9/76 Location 38 Engr. W. NAZIMOWITZ

Unit No.__________ Fuel GAS Capacity__________

Unit Type CE VERTICAL Burner Type__________

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | 200G-10 | | 200G-11 | | 200G-12 | | 200G-13 | | 200G-14 | |
| 2. Date | | | | | | | | | | |
| 3. Time | | | | | | | | | | |
| 4. Load (k#/hr) | 38.0 | | 39.5 | | 40.5 | | 40.7 | | 40.7 | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | | | | | | | | | | |
| 7. Probe Position | | | | | | | | | | |
| 8. Oxygen (%) COLD LINE/HOT LINE | 1.0 | | 1.35 | | 2.5 | | 1.55 | | 1.8 | 1.8 |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | | | | | | | | | 160 | 180 |
| 10. NO (hot) read/3% $O_2$ (ppm)* | | | | | | | | | 160 | 180 |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | | | | | | | | | 0 | 0 |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 110 | 99 | 126 | 115 | 186 | 181 | 178 | 165 | 205 | 192 |
| 13. Carbon Dioxide (%) | 9.7 | | 10.5 | | 10.25 | | 10.75 | | 10.75 | |
| 14. Carbon Monoxide (ppm) uncor/cor* | 2000> | | 2000> | | 29 | | 250 | | | |
| 15. Hydrocarbon (ppm) uncor/cor* | 8 | | 6 | | 6 | | 8 | | | |
| 16. Sulfur Dioxide (ppm) uncor/cor* | | | | | | | | | | |
| 17. Smoke Spot (Bacharach) | | | | | | | | | | |
| 18. Atmos. Temp. (°F/°C) | | | | | | | | | | |
| 19. Dew Point Temp. (°F/°C) | | | | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | | | 29.99 | | | | 29.99 | | 29.99 | |
| 21. Relative Humidity (%) | | | | | | | | | | |
| 22. STACK $O_2$ % | | | | | | | | | 6.25 | |
| 23. WATER CONTENT (% VOL.) | | | | | | | | | 16.8 | |
| 24. NO (ROOF) / CORR. | | | | | | | | | 157 | 192 |
| 25. CO COLD LINE/HOT LINE | 2000> | | 2000> | | 29 | | 250 | | 26 | 28 |
| 26. CO ROOF LINE | | | | | | | | | 28 | |
| 27. $CO_2$ COLD LINE/HOT LINE | 9.7 | | 10.5 | | 10.25 | | 10.75 | | 10.75 | 10.75 |
| 28. $CO_2$ ROOF LINE | | | | | | | | | 8.0 | |
| 29. | VR low | | VR low | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

## MOBILE LABORATORY DATA

Test No.

Test No. Date 6/9 Location 38 Engr. W. NAZIMOWITZ

Unit No. Fuel GAS Capacity 45 k#/hr

Unit Type CE VERTICAL Burner Type

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | 200G-15 | | 200G-16 | | 204-18 | | 204-19 | | 204-20 | |
| 2. Date | | | | | | | | | | |
| 3. Time | | | | | | | | | | |
| 4. Load (k#/hr) | 40.5 | | 40.5 | | 40.0 | | 39.8 | | 40.0 | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | | | | | | | | | | |
| 7. Probe Position | | | | | | | | | | |
| 8. Oxygen (%) COLD LINE/HEATED LINE | 2.35 | 2.45 | 2.4 | 2.4 | 2.25 | 2.35 | 3.45 | 3.55 | 2.8 | 2.85 |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 178 | 207 | 152 | 176 | 88 | 102 | 112 | 137 | 96 | 113 |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 180 | 209 | 157 | 182 | 88 | 102 | 112 | 137 | 96 | 113 |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 212 | 205 | 198 | 192 | 107 | 103 | 140 | 144 | 120 | 119 |
| 13. Carbon Dioxide (%) | 10.5 | | 10.5 | | 10.5 | | 9.75 | | 10.25 | |
| 14. Carbon Monoxide (ppm) uncor/cor* | | | | | | | | | | |
| 15. Hydrocarbon (ppm) uncor/cor* | 5 | | 4 | | 2 | | 2 | | 3 | |
| 16. Sulfur Dioxide (ppm) uncor/cor* | | | | | | | | | | |
| 17. Smoke Spot (Bacharach) | | | | | | | | | | |
| 18. Atmos. Temp. (°F/°C) | 79 | | 87 | | 80 | | 81 | | 83 | |
| 19. Dew Point Temp. (°F/°C) | 68 | | 70 | | 71 | | 70 | | 70 | |
| 20. Atmos. Pressure (in. Hg) | 29.98 | | 29.96 | | 29.93 | | 29.93 | | 29.92 | |
| 21. Relative Humidity (%) | | | | | | | | | | |
| 22. STACK $O_2$ % | 6.75 | | 6.7 | | 6.4 | | 7.35 | | 6.8 | |
| 23. WATER CONTENT (% VOL.) | 16.3 | | 16.4 | | 16.4 | | 15.3 | | 15.9 | |
| 24. NO (ROOF) /CORR. | 165 | 208 | 150 | 189 | 80 | 99 | 109 | 144 | 92 | 117 |
| 25. CO COLD LINE/HOT LINE | 19 | 26 | 10 | 10 | 286 | 200 | 12 | 12 | 29 | 29 |
| 26. CO ROOF LINE | 16 | | 6 | | 200 | | 10 | | 26 | |
| 27. $CO_2$ COLD LINE/HOT LINE | 10.5 | 10.25 | 10.5 | 10.5 | 10.5 | 10.5 | 9.75 | 9.75 | 10.25 | 10.25 |
| 28. $CO_2$ ROOF LINE | 8.0 | | 7.8 | | 8.0 | | 7.4 | | 7.8 | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

**MOBILE LABORATORY DATA** Test No.________

Test No.________ Date 6/10 Location 38 Engr. W. NAZIV[illegible]

Unit No.________ Fuel GAS Capacity 45 K#/hr

Unit Type CE VERTICAL Burner Type________

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | 200G-17 | | 200G-17A | | 200G-17B | | 200G-17C | | 200G-17D | |
| 2. Date | | | | | | | | | | |
| 3. Time | | | | | | | | | | |
| 4. Load (K#/hr) | 39.5 | | 39.5 | | 39.5 | | 39.5 | | 39.5 | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | | | | | | | | | | |
| 7. Probe Position | | | | | | | | | | |
| 8. Oxygen (%) COLD LINE/HOT LINE | 2.2 | 2.3 | 4.4 | | 2.9 | | 2.25 | | 2.4 | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 154 | 177 | | | | | | | | |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 154 | 177 | | | | | | | | |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 0 | 0 | | | | | | | | |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 169 | 162 | 152 | 165 | 171 | 170 | 178 | 171 | 157 | 152 |
| 13. Carbon Dioxide (%) | 10.5 | | 8.7 | | 10.25 | | 10.5 | | 10.5 | |
| 14. Carbon Monoxide (ppm) uncor/cor* | | | 10 | | 6 | | 10 | | 12> | |
| 15. Hydrocarbon (ppm) uncor/cor* | 3 | | | | | | | | | |
| 16. Sulfur Dioxide (ppm) uncor/cor* | | | | | | | | | | |
| 17. Smoke ~~Spot (Bacharach)~~ NUMBER | 1 | | | | | | | | | |
| 18. Atmos. Temp. (°F/°C) | 72 | | | | | | | | | |
| 19. Dew Point Temp. (°F/°C) | 69 | | | | | | | | | |
| 20. Atmos. Pressure (in. Hg) | 30.07 | | | | | | | | | |
| 21. Relative Humidity (%) | | | | | | | | | | |
| 22. STACK $O_2$ % | 6.5 | | 6.45 | | | | | | | |
| 23. WATER CONTENT (% VOL) | 16.45 | | | | | | | | | |
| 24. NO (ROOF)/CORR. | 130 | 162 | 135 | 167 | | | | | | |
| 25. CO COLD LINE/HOT LINE | 12 | 10 | 10 | | 6 | | 10 | | 12> | |
| 26. CO ROOF LINE | 10 | | 6 | | | | | | | |
| 27. $CO_2$ COLD LINE/HOT LINE | 10.5 | 10.5 | 8.7 | | 10.25 | | 10.25 | | 10.5 | |
| 28. $CO_2$ ROOF LINE | 8.0 | | 8.0 | | | | | | | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

MOBILE LABORATORY DATA Test No.________

Test No.__________ Date 6/10 Location 38 Engr. W. NAZIMOWITZ

Unit No.__________ Fuel GAS Capacity 45 k#/hr

Unit Type CE VERTICAL Burner Type__________

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | BASELINE | | | | | | | | | |
| 1. Test No. | 2006-17E | | 204-21 | | 204-22 | | 204/5-23 | | 204/5-24 | |
| 2. Date | | | | | | | | | | |
| 3. Time | | | | | | | | | | |
| 4. Load (k#/hr) | 39.5 | | 39.6 | | 39.6 | | 39.0 | | 39.0 | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | | | | | | | | | | |
| 7. Probe Position | | | | | | | | | | |
| 8. Oxygen (%) COLD LINE/HOT LINE | 3.2 | | 2.83 | 2.85 | 2.75 | 2.9 | 2.45 | 2.5 | 2.45 | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | | | 93 | 110 | 110 | 131 | 68 | 79 | | |
| 10. NO (hot) read/3% $O_2$ (ppm)* | | | 92 | 108 | 109 | 130 | 68 | 79 | | |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | | | 1 | 2 | 1 | 1 | 0 | 0 | | |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 151 | 153 | 108 | 107 | 128 | 126 | 83 | 81 | 76 | 74 |
| 13. Carbon Dioxide (%) | 10.5 | | 10.25 | | 10.00 | | 10.25 | | 10.25 | |
| 14. Carbon Monoxide (ppm) uncor/cor* | | | | | | | | | | |
| 15. Hydrocarbon (ppm) uncor/cor* | | | | | | | | | | |
| 16. Sulfur Dioxide (ppm) uncor/cor* | | | | | | | | | | |
| 17. Smoke Spot (Bacharach) | | | | | | | | | | |
| 18. Atmos. Temp. (°F/°C) | 78 | | 82.5 | | 87 | | 90.5 | | 92 | |
| 19. Dew Point Temp. (°F/°C) | 69 | | 71.5 | | 72.5 | | 71.5 | | 71 | |
| 20. Atmos. Pressure (in. Hg) | 30.05 | | 30.00 | | 29.99 | | 29.94 | | 29.90 | |
| 21. Relative Humidity (%) | | | | | | | | | | |
| 22. STACK $O_2$% | 6.5 | | 6.85 | | 6.9 | | 6.45 | | 6.5 | |
| 23. WATER CONTENT (% VOL.) | | | 16 | | 15.9 | | 16.3 | | | |
| 24. NO (ROOF) /CORR. | 140 | 174 | 82 | 104 | 98 | 125 | 64 | 79 | 60 | 75 |
| 25. CO COLD LINE/HOT LINE | 12 | | 35 | 32 | 29 | 32 | 166 | 137/232 | 18 | |
| 26. CO ROOF LINE | 6 | | 46 | | <92> | | 470 | | 72 | |
| 27. $CO_2$ COLD LINE/HOT LINE | 10.5 | | 10.25 | 10.25 | 10.0 | 10.0 | 10.25 | 10.25 | 10.25 | |
| 28. $CO_2$ ROOF LINE | 8.0 | | 7.8 | | 7.6 | | 8.00 | | 7.8 | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

# MOBILE LABORATORY DATA

Test No.

Test No. Date 6/10 Location 38 Engr. W. NAZIMOWITZ

Unit No. Fuel GAS Capacity 45 k#/hr

Unit Type CE VERTICAL Burner Type

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | 204/5-25 | | 204/5-26 | | 204/5-27 | | 204/5-28 | | 204/5-29 | |
| 2. Date | | | | | | | | | | |
| 3. Time | | | | | | | | | | |
| 4. Load (k#/hr) | 39.0 | | 39.4 | | 39.0 | | 39.0 | | 39.0 | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | | | | | | | | | | |
| 7. Probe Position | | | | | | | | | | |
| 8. Oxygen (%) COLD LINE/~~HOT~~ HOT LINE | 2.6 | | 2.55 | | 2.52 | | 2.3 | 2.4 | 2.3 | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | | | | | | | 42 | 49 | | |
| 10. NO (hot) read/3% $O_2$ (ppm)* | | | | | | | 42 | 49 | | |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | | | | | | | 0 | 0 | | |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 76 | 74 | 48 | 47 | 49 | 48 | 52 | 50 | 58 | 56 |
| 13. Carbon Dioxide (%) | 10.0 | | 10.0 | | 10.0 | | 10.0 | | 10.25 | |
| 14. Carbon Monoxide (ppm) uncor/cor* | | | | | | | | | | |
| 15. Hydrocarbon (ppm) uncor/cor* | 4 | | 4 | | 4 | | 3 | | | |
| 16. Sulfur Dioxide (ppm) uncor/cor* | | | | | | | | | | |
| 17. Smoke ~~Spot (Bacharach)~~ NUMBER | 1 | | | | | | | | | |
| 18. Atmos. Temp. (°F/°C) | 90 | | 86 | | 84 | | 79.5 | | 79 | |
| 19. Dew Point Temp. (°F/°C) | 71 | | 71 | | 70 | | 68 | | 67 | |
| 20. Atmos. Pressure (in. Hg) | 29.89 | | 29.89 | | 29.88 | | 29.88 | | 29.88 | |
| 21. Relative Humidity (%) | | | | | | | | | | |
| 22. STACK $O_2$ % | 6.55 | | 6.15 | | 6.35 | | 6.25 | | 6.35 | |
| 23. WATER CONTENT (% VOL.) | | | | | | | 16.4 | | | |
| 24. NO (ROOF) /CORR. | 61 | 76 | 38 | 46 | 37 | 46 | 40 | 49 | 44 | 54 |
| 25. CO COLD LINE/HOT LINE | 39 | | 810 | | 910/1250 | | 49/72 | 58 | 26 | |
| 26. CO ROOF LINE | 49 | | 470 | | 550/730 | | 100/174 | | 26/35 | |
| 27. $CO_2$ COLD LINE/HOT LINE | 10.0 | | 10.0 | | 10.0 | | 10.0 | 10.25 | 10.25 | |
| 28. $CO_2$ ROOF LINE | 7.8 | | 8.0 | | 8.0 | | 8.0 | | 8.0 | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

6/10/76-
MOBILE LABORATORY DATA

Test No.________

Test No.__________ Date 6/11/76 Location 38 Engr. W. NAZIMOWITZ

Unit No.__________ Fuel GAS Capacity 45 K#/hr

Unit Type CE VERTICAL Burner Type__________

6/11

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | 204/5-30 | | 204/5-31 | | 204/5-32 | | 200G-18 | | 200G-19 | |
| 2. Date | | | | | | | | | | |
| 3. Time | | | | | | | | | | |
| 4. Load (k#/hr) | 39.0 | | 39.0 | | 39.0 | | 39.5 | | 39.5 | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | | | | | | | | | | |
| 7. Probe Position | | | | | | | | | | |
| 8. Oxygen (%) COLD / HEATED | 2.25 | | 2.0 | | 1.9 | | 2.05 | 2.1 | 1.98 | 1.98 |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | | | | | | | 145 | 166 | 118 | 135 |
| 10. NO (hot) read/3% $O_2$ (ppm)* | | | | | | | 145 | 166 | 118 | 135 |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | | | | | | | 0 | 0 | 0 | 0 |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 49 | 47 | 52 | 49 | 68 | 64 | 164 | 156 | 138 | 131 |
| 13. Carbon Dioxide (%) | 10.25 | | 10.5 | | 10.5 | | 10.5 | | 10.5 | |
| 14. Carbon Monoxide (ppm) uncor/cor* | 58 | 56 | | | | | | | | |
| 15. Hydrocarbon (ppm) uncor/cor* | | | | | | | | | | |
| 16. Sulfur Dioxide (ppm) uncor/cor* | | | | | | | | | | |
| 17. Smoke ~~Spot (Bacharach)~~ NUMBER | | | | | | | 1 | | | |
| 18. Atmos. Temp. (°F/°C) | | | | | | | 74 | | 77.5 | |
| 19. Dew Point Temp. (°F/°C) | | | | | | | 68.5 | | 69.0 | |
| 20. Atmos. Pressure (in. Hg) | | | | | | | 29.78 | | 29.77 | |
| 21. Relative Humidity (%) | | | | | | | | | | |
| 22. STACK $O_2$ % | | | 6.15 | | 6.18 | | 6.5 | | 6.35 | |
| 23. NO (ROOF) / CORR. | 47 | 45 | 42 | 51 | 54 | 66 | 126 | 156 | 104 | 128 |
| 24. CO COLD LINE / HOT LINE | 58 | 56 | 106/152 | | 450 | | 16 | 12 | | |
| 25. CO ROOF LINE | | | 66/137 | | 160 | | 10 | | | |
| 26. $CO_2$ COLD LINE / HOT LINE | 10.25 | | 10.5 | | 10.5 | | 10.5 | 10.5 | | |
| 27. $CO_2$ ROOF LINE | | | 8.0 | | 8.0 | | 7.8 | | | |
| 28. | | | | | | | | | | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

## MOBILE LABORATORY DATA

Test No.________

Test No.__________ Date 6/11/76 Location 38 Engr. W. NAZIMOWITZ

Unit No.__________ Fuel GAS Capacity 45 k#/hr

Unit Type CE VERTICAL Burner Type__________

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test No. | 2006-20 | | 2006-21 | | 2006-22 | | 2006-23 | | | |
| 2. Date | | | | | | | | | | |
| 3. Time | | | | | | | | | | |
| 4. Load (k#/hr) | 39.5 | | | | | | | | | |
| 5. Process Rate | | | | | | | | | | |
| 6. Flue Diam. or Size, ft | | | | | | | | | | |
| 7. Probe Position | | | | | | | | | | |
| 8. Oxygen (%) COLD/HEATED | 2.8 | 2.85 | 4.05 | — | 2.4 | — | 1.8 | — | | |
| 9. NOx (hot) read/3% $O_2$ (ppm)* | 110 | 130 | | | | | | | | |
| 10. NO (hot) read/3% $O_2$ (ppm)* | 110 | 130 | | | | | | | | |
| 11. $NO_2$ (hot) read/3% $O_2$ (ppm)* | 0 | 0 | | | | | | | | |
| 12. NO (cold) read/3% $O_2$ (ppm)* | 137 | 136 | 132 | 140 | 152 | 147 | 152 | 143 | | |
| 13. Carbon Dioxide (%) | 10.0 | | | | | | | | | |
| 14. Carbon Monoxide (ppm) uncor/cor* | | | | | | | | | | |
| 15. Hydrocarbon (ppm) uncor/cor* | 4 | | | | | | | | | |
| 16. Sulfur Dioxide (ppm) uncor/cor* | | | | | | | | | | |
| 17. Smoke Spot (Bacharach) | | | | | | | | | | |
| 18. Atmos. Temp. (°F/°C) | 81 | | 83 | | 83 | | 84 | | | |
| 19. ~~Dew Point~~ WET BULB Temp. (°F/°C) | 69 | | 70 | | 70 | | 70 | | | |
| 20. Atmos. Pressure (in. Hg) | 29.75 | | 29.73 | | 29.73 | | 29.73 | | | |
| 21. Relative Humidity (%) | | | | | | | | | | |
| 22. STACK $O_2$ % | 6.95 | | 7.8 | | 6.6 | | 6.2 | | | |
| 23. WATER CONTENT (% VOL.) | 16.0 | | | | | | | | | |
| 24. NO (ROOF) /CORR. | 107 | 137 | 103 | 141 | 118 | 148 | 116 | 141 | | |
| 25. CO COLD LINE/HOT LINE | 10 | 10 | 6 | | 6 | | 232 | | | |
| 26. CO ROOF LINE | 6 | | 3 | | 6 | | 470 | | | |
| 27. $CO_2$ COLD LINE/HOT LINE | 10.0 | 10.0 | | | | | | | | |
| 28. $CO_2$ ROOF LINE | 7.6 | | | | | | | | | |
| 29. | | | | | | | | | | |
| 30. | | | | | | | | | | |

*Correction to 3% $O_2$ should not be performed if the value is measured on a wet basis.

Data Sheet 6002-2

# KVB

Test No. ____

Engr. ____

CONTROL ROOM DATA

Test Number 202+203 Date 5/19/76 - 5/20/76

Unit Number ____ Owner ____

Fuel #6 Location 38

Capacity (K#/hr) 45

Furnace Type ____ Burner Type ____

<table>
<tr><td></td><td colspan="12">TIME OF DAY EDT</td><td colspan="6">1100</td><td colspan="6">1530</td><td colspan="6">5/20/76<br>1100</td></tr>
<tr><td>1. Test Number</td><td colspan="6">202-3</td><td colspan="6">200-22</td><td colspan="6">203-26A</td><td colspan="6">203-26B</td><td colspan="6">203-27A</td></tr>
<tr><td>2. Load (K#/hr)</td><td colspan="6">35-34</td><td colspan="6">38</td><td colspan="6">38</td><td colspan="6">39</td><td colspan="6">38</td></tr>
<tr><td>3. Control Method Auto/Hand</td><td colspan="6">LOW PREHEAT</td><td colspan="6">TODAY'S</td><td colspan="6">SCA SO2 + PARTICULATE</td><td colspan="6">PARTIC.</td><td colspan="6">SCA SO2 + PARTICAL SIZE</td></tr>
<tr><td>4. Staged Air Port Open</td><td colspan="6">BURNER FULLY OPEN</td><td colspan="6">BASELINE</td><td colspan="6">14 + 15</td><td colspan="6"></td><td colspan="6">14 + 15</td></tr>
<tr><td>5. STACK O2</td><td colspan="6">129 °F</td><td colspan="6">—</td><td colspan="6">15% THRU SCA</td><td colspan="6"></td><td colspan="6">7.1</td></tr>
<tr><td>6. Oxygen/Air Level (%) FURN. EXIT wet | cold</td><td colspan="3">2.6</td><td colspan="3">2.6</td><td colspan="3">-</td><td colspan="3">3.4</td><td colspan="3">3.5</td><td colspan="3">3.5</td><td colspan="3">3.1</td><td colspan="3">3.2</td><td colspan="3"></td><td colspan="3">3.3</td></tr>
<tr><td>7. [illegible] Pressure (psig)</td><td colspan="6">133</td><td colspan="6">—</td><td colspan="6">139</td><td colspan="6"></td><td colspan="6"></td></tr>
<tr><td>8. Final Steam Press/Temp(psig/°F)</td><td colspan="3">140</td><td colspan="3">—</td><td colspan="3">—</td><td colspan="3"></td><td colspan="3">142</td><td colspan="3"></td><td colspan="3">—</td><td colspan="3"></td><td colspan="3"></td><td colspan="3"></td></tr>
<tr><td>9. Fuel-Air Ratio Setting | OIL LOADING</td><td colspan="3">45</td><td colspan="3">57</td><td colspan="3">38</td><td colspan="3">77</td><td colspan="3">38</td><td colspan="3">64</td><td colspan="3">36</td><td colspan="3">65</td><td colspan="3">38</td><td colspan="3">65</td></tr>
<tr><td>10. Feedwater Press/Temp(psig/°F)</td><td colspan="3">-</td><td colspan="3">260</td><td colspan="3">—</td><td colspan="3"></td><td colspan="3"></td><td colspan="3">267</td><td colspan="3">—</td><td colspan="3"></td><td colspan="3"></td><td colspan="3"></td></tr>
<tr><td>11. Air Flow Primary/Secondary( )</td><td colspan="3">—</td><td colspan="3"></td><td colspan="3">—</td><td colspan="3"></td><td colspan="3">—</td><td colspan="3"></td><td colspan="3"></td><td colspan="3"></td><td colspan="3">—</td><td colspan="3"></td></tr>
<tr><td>12. Air Temp Primary/Secondary(°F)</td><td colspan="3">—</td><td colspan="3"></td><td colspan="3">—</td><td colspan="3"></td><td colspan="3">—</td><td colspan="3"></td><td colspan="3"></td><td colspan="3"></td><td colspan="3">—</td><td colspan="3"></td></tr>
<tr><td>13. Fan Setting FD/ID</td><td colspan="3">62</td><td colspan="3">84</td><td colspan="3">65</td><td colspan="3">77</td><td colspan="3">50</td><td colspan="3">77</td><td colspan="3">53</td><td colspan="3">77</td><td colspan="3">54</td><td colspan="3">80</td></tr>
<tr><td>14. Register Setting (%open C.C.)</td><td colspan="6">—</td><td colspan="6">—</td><td colspan="6">—</td><td colspan="6">—</td><td colspan="6">—</td></tr>
<tr><td>15. Fuel Flow (~~lb/hr~~)* GAL/MIN</td><td colspan="6">5.90</td><td colspan="6">6.0</td><td colspan="6">5.9</td><td colspan="6">5.9</td><td colspan="6">5.83</td></tr>
<tr><td>16. Fuel Press/Temp (psig/°F)</td><td colspan="3">90</td><td colspan="3">218</td><td colspan="3">90</td><td colspan="3">220</td><td colspan="3">91</td><td colspan="3">220</td><td colspan="3">90</td><td colspan="3">220</td><td colspan="3">91</td><td colspan="3">220</td></tr>
<tr><td>17. Fuel Atomization Press (psig)</td><td colspan="6">112</td><td colspan="6">112</td><td colspan="6">114</td><td colspan="6">115</td><td colspan="6">114</td></tr>
<tr><td>18. Pressure Furnace/Windbox (iwg)</td><td colspan="3">-.2</td><td colspan="3">1.3</td><td colspan="3">-.2</td><td colspan="3">1.7</td><td colspan="3">-.2</td><td colspan="3">1.15</td><td colspan="3">-.18</td><td colspan="3">1.1</td><td colspan="3">-.20</td><td colspan="3">1.2</td></tr>
<tr><td>19. Smoke ~~Meter~~ SPOT</td><td colspan="6">8</td><td colspan="6">—</td><td colspan="6">7</td><td colspan="6">—</td><td colspan="6">7</td></tr>
<tr><td>20. Stack Temp. (°F)</td><td colspan="6">518</td><td colspan="6">—</td><td colspan="6">424</td><td colspan="6">426</td><td colspan="6">427</td></tr>
<tr><td>21. Boiler Outlet Press (iwg)</td><td colspan="6">-.73</td><td colspan="6">-.70</td><td colspan="6">-.7</td><td colspan="6">-.7</td><td colspan="6">-.8</td></tr>
<tr><td>22. Boiler Outlet Temp. (°F)</td><td colspan="6">635</td><td colspan="6">—</td><td colspan="6">630</td><td colspan="6">640</td><td colspan="6">635</td></tr>
<tr><td>23. Air Heater Inlet Temp.(°F)</td><td colspan="3">80</td><td colspan="3">252</td><td colspan="3">—</td><td colspan="3"></td><td colspan="3">86</td><td colspan="3">—</td><td colspan="3">92</td><td colspan="3">—</td><td colspan="3">92</td><td colspan="3">—</td></tr>
<tr><td>24. Air Heater Outlet Temp. (°F)/IWG</td><td colspan="3"></td><td colspan="3">-1.8</td><td colspan="3"></td><td colspan="3">-1.8</td><td colspan="3">—</td><td colspan="3">-1.9</td><td colspan="3"></td><td colspan="3">-1.8</td><td colspan="3"></td><td colspan="3">-1.9</td></tr>
<tr><td>25. Windbox Temperature (°F) 1 | 2 | 3</td><td colspan="2">120</td><td colspan="2">125</td><td colspan="2">124</td><td colspan="2">225</td><td colspan="2">275</td><td colspan="2">190°</td><td colspan="2">300</td><td colspan="2">296</td><td colspan="2">210°</td><td colspan="2">315</td><td colspan="2">—</td><td colspan="2">230°</td><td colspan="2">305</td><td colspan="2">—</td><td colspan="2">220°</td></tr>
<tr><td>26. 4 | 5 | WB</td><td colspan="2">130</td><td colspan="2">140</td><td colspan="2">125</td><td colspan="2">290</td><td colspan="2">295</td><td colspan="2"></td><td colspan="2">340</td><td colspan="2">—</td><td colspan="2"></td><td colspan="2">330</td><td colspan="2">—</td><td colspan="2"></td><td colspan="2">320</td><td colspan="2">—</td><td colspan="2"></td></tr>
<tr><td>27. MASTER</td><td colspan="6">83</td><td colspan="6">32</td><td colspan="6">28</td><td colspan="6">27</td><td colspan="6">42</td></tr>
<tr><td>28. NO FURNACE EXIT (COLD) PPM</td><td colspan="3">225</td><td colspan="3">220</td><td colspan="6"></td><td colspan="6"></td><td colspan="12">ANALYZER BROKEN DOWN</td></tr>
</table>

*Fuel flow in lb/hr needed for efficiency calculation.

* BOILER TEMP. - CONTROLLER READOUT

4/76
60-33

**KVB**

Test No. ____

Engr. W.N.

CONTROL ROOM DATA

Test Number ____ Date 5/24/76

Unit Number ____ Owner ____

Fuel NO. 6 Location 38

Capacity (K#/hr) 45

Furnace Type CE VERTICAL Burner Type ____

| | 5/24/76 | | | | 5/24/76 | | 5/25/76 | | 525 1100 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test Number | 200-23 | | | | 200-24 | | 200-25 | | 201-12 | |
| 2. Load (K#/hr) | 38 | | | | 38 | | 38.2 | | 38.8 | |
| 3. Control Method Auto/Hand | HAND | | | | ✓ | | ✓ | | ✓ | |
| 4. Staged Air Port Open | NONE | | | | ✓ | | ✓ | | ✓ | |
| 5. | BASELINE PARTIC. + SOx | | | | BASELINE IMPACTOR | | BASELINE | | LOW $O_2$ | |
| 6. Oxygen/Air Level (%) | | | | | | | | | | |
| 7. LINE ~~Drum~~ Pressure (psig) | 139 | | | | 139 | | 138 | | 137 | |
| 8. Final Steam Press/Temp(psig/°F) | 146 | | | | 147 | | 145 | | 145 | |
| 9. Fuel-Air Ratio Setting /OIL LOAD | 30 / 84 | | ✓ | | ✓ | | 34 / 78 | | 34 / 72 | |
| 10. Feedwater Press/Temp(psig/°F) | 272 | | | | 278 | | 274 | | 275 | |
| 11. Air Flow Primary/Secondary( ) | | | | | | | | | | |
| 12. Air Temp Primary/Secondary(°F) | 86 | | | | 84 | | 74 | | 76 | |
| 13. Fan Setting FD/ID | 64 | 76 | | | 64 | 76 | 62 | 75 | 57 | 64 |
| 14. Register Setting (%open C.C.) | 100% | | | | 100% | | 100% | | 100% | |
| 15. Fuel Flow (lb/hr)* | 5.8 | | | | 5.8 | | 5.9 | | 5.9 | |
| 16. Fuel Press/Temp (psig/°F) | 91 | 218 | | | 91 | 218 | 92 | 217 | 91 | 217 |
| 17. Fuel Atomization Press (psig) | 115 | | | | 115 | | 115 | | 115 | |
| 18. Pressure Furnace/Windbox (iwg) | -0.2 | 1.6 | | | -0.2 | 1.6 | -0.2 | 1.5 | -1.9 | 1.35 |
| 19. Smoke Meter | 3△ | | | | 4△ | | 3△ | | 7 | |
| 20. Stack Temp. (°F) | 430* | | | | 442* | | 437 | | 427 | |
| 21. Boiler Outlet Press (iwg) | -.75 | | | | -.75 | | -.76 | | -.65 | |
| 22. Boiler Outlet Temp. (°F) | 650 | | | | 650 | | 645 | | 630 | |
| 23. Air Heater Inlet Temp.(°F) | | | | | | | | | | |
| 24. Air Heater Outlet Temp. (°F)/iwg | /-1.8 | | | | /-1.8 | | /-1.85 | | /-1.6 | |
| 25. Windbox Temperature (°F) 1 / 4 | 283/298 | | | | 281/298 | | 272/290 | | 275/292 | |
| 26. | | | | | | | | | | |
| 27. MASTER CONTROL | 18 | | | | 26 | | 40 | | 40 | |
| 28. | | | | | | | | | | |

*Fuel flow in lb/hr needed for efficiency calculation.

* HARD TO READ. NO AMBER LIGHT. I 5-10 DEG.

△ GREENISH

4/76
60-33

**KVB**

Test No. ______________

Engr. W.N.

CONTROL ROOM DATA

Test Number 202, 200, 201

Date 5/25/75, 5/26/75

Unit Number ______________

Owner ______________

Fuel NO. 6

Location ______________

Capacity (K#/hr) 45

Furnace Type CE VERTICAL

Burner Type PEABODY STAN. ATOM.

| | 1450 | | 1500 | | 5/26 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test Number | 202-4 | | 202-4A | | 200-26 | | 201-13 | | 201-14 | |
| 2. Load (K#/hr) | 34.0 | | 34 | | 38.5 | | 38.5 | | 39.0 | |
| 3. Control Method Auto/Hand | HAND | | ✓ | | HAND | | ✓ | | ✓ | |
| 4. Staged Air Port Open | NONE | | ✓ | | NONE | | ✓ | | ✓ | |
| 5. | LOW TEMP. | | ✓ | | BASELINE | | LOW $O_2$ | | LOW $O_2$ | |
| 6. Oxygen/Air Level (%) | MAX BYPASS | | | | | | INJECTOR | | $SO_2$ | |
| 7. Line ~~Drum~~ Pressure (psig) | | | 138 | | 137 | | 137 | | 137 | |
| 8. Final Steam Press/Temp(psig/°F) | | | 145 | | 145 | | 145 | | 145 | |
| 9. Fuel-Air Ratio Setting | 34/68 | | ✓ | ✓ | | | 28/78 | | 28/80 | |
| 10. Feedwater Press/Temp(psig/°F) | | | 278 | | 275 | | 275 | | 276 | |
| 11. Air Flow Primary/Secondary( ) | | | | | | | | | | |
| 12. Air Temp Primary/Secondary(°F) | | | 76 | | 77 | | 80 | | 81 | |
| 13. Fan Setting FD/ID | 68 | 80 | 61 | 84 | 60 | 72 | 56 | 61 | 58 | 66 |
| 14. Register Setting (%open C.C.) | 100% | | 100% | | 100% | | 100% | | 100% | |
| 15. Fuel Flow (lb/hr)* | | | 5.85 | | | | 5.9 | | 5.85 | |
| 16. Fuel Press/Temp (psig/°F) | 92 | 216 | 92 | 216 | 92 | 216 | 90 | 217 | 92 | 218 |
| 17. Fuel Atomization Press (psig) | 115 | | 115 | | 115 | | 114 | | 115 | |
| 18. Pressure Furnace/Windbox (iwg) | -0.03 | 1.55 | -0.2 | 1.2 | -0.2 | 1.4 | -0.2 | 1.2 | -0.2 | 1.35 |
| 19. Smoke Meter | 3 | | 4 | | | | 6 | | 6 | |
| 20. Stack Temp. (°F) | 550 | | 550 | | | | 430 | | 430 | |
| 21. Boiler Outlet Press (iwg) | | | -.75 | | | | -.7 | | -.65 | |
| 22. Boiler Outlet Temp. (°F) | 650 | | 650 | | 635 | | 630 | | 640 | |
| 23. Air Heater Inlet Temp.(°F) | | | | | | | | | | |
| 24. Air Heater Outlet Temp. (°F) | | | -1.85 | | | | -1.7 | | -1.7 | |
| 25. Windbox Temperature (°F) 1/4 | | | 120/130 | | | | 270/287 | | 280/295 | |
| 26. | | | | | | | | | | |
| 27. BOILER MASTER | 32 | | 32 | | | | 46 | | 32 | |
| 28. | | | | | | | | | | |

*Fuel flow in lb/hr needed for efficiency calculation.

4/76
60-33

**KVB**

Test No. ____________

Engr. W. N.

CONTROL ROOM DATA

Test Number 202, 200, 201, 203

Date 5/26/76, 5/27/76

Unit Number ____________

Owner ____________

Fuel NO. 6

Location 38

Capacity (K#/hr) 45

Furnace Type CE VERTICAL

Burner Type PEABODY - STAN, ATOM.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 5/26 | | 5/27 | | | | | | |
| 1. Test Number | 202-5 | | 200-27 | | 201-15 | | 203-28 | | |
| 2. Load (K#/hr) | 34.0 | | 38.0 | | 38.8 | | 38.5 | | |
| 3. Control Method Auto/Hand | HAND | | HAND | | ✓ | | ✓ | | |
| 4. Staged Air Port Open | NONE | | NONE | | ✓ | | 14 + 15 | | |
| 5. | VPH LOW TEMP | | BASELINE | | LOW O2 | | | | |
| 6. Oxygen/Air Level (%) | IMPACTOR + SOx | | | | METHOD 5 PARTIC. | | IMPACTOR | | |
| 7. LINE ~~Drum~~ Pressure (psig) | 138 | | 137 | | 137 | | 138 | | |
| 8. Final Steam Press/Temp(psig/°F) | 145 | | 144 | | 145 | | 145 | | |
| 9. Fuel-Air Ratio Setting /OIL LOADER | 28/76 | | 37/71 | | — | | — | | |
| 10. Feedwater Press/Temp(psig/°F) | 277 | | 273 | | 275 | | 277 | | |
| 11. Air Flow Primary/Secondary( ) | | | | | | | | | |
| 12. Air Temp Primary/Secondary(°F) | 82 | | 76 | | 80 TO 85 | | 89 TO 90 | | |
| 13. Fan Setting FD/ID | 62 | 84 | 60 | 71 | 58 | 66 | 50 | 80 | |
| 14. Register Setting (%open C.C.) | 100% | | 100% | | 100% | | 100% | | |
| 15. Fuel Flow (lb/hr)* | 5.8 + | | | | | | 5.98 | | |
| 16. Fuel Press/Temp (psig/°F) | 92 | 217 | 92 | 218 | 92 | 218 | 91 | 218 | |
| 17. Fuel Atomization Press (psig) | 115 | | 115 | | 115 | | 115 | | |
| 18. Pressure Furnace/Windbox (iwg) | -0.2 | 1.2 | -0.2 | 1.5 | -0.2 | 1.35 | -0.2 | 1.1 | |
| 19. Smoke Meter | 3 | | 4 | | | | | | |
| 20. Stack Temp. (°F) | 540 | | | | 430 | | 450 | | |
| 21. Boiler Outlet Press (iwg) | -.72 | | -.73 | | -.6 | | .8 | | |
| 22. Boiler Outlet Temp. (°F) | 650 | | 638 | | 630 | | 650 | | |
| 23. Air Heater Inlet Temp.(°F) | | | | | | | | | |
| 24. Air Heater Outlet Temp. (°F) | -1.85 | | -1.8 | | -1.5 | | -2.0 | | |
| 25. Windbox Temperature (°F) 1/4 | | | 272/285 | | (276/293 | | | | |
| 26. 1/2/4 | 126/127/135 | | | | TO 280/297) | | 313/326 | | |
| 27. MASTER CONTROL | 60 | | 46 | | | | | | |
| 28. | | | | | | | | | |

*Fuel flow in lb/hr needed for efficiency calculation.

BEGIN AND END OF TEST

4/76
60-33

**KVB**

Test No.

Engr. W. N.

CONTROL ROOM DATA

Test Number 200G-1

Date 6/1/76

Unit Number

Owner

Fuel NATURAL GAS

Location 38

Capacity (K#/hr) 45

Furnace Type C.E. VERTICAL

Burner Type PEABODY - RING

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 6/1/76 | | 6/2/76 | | | | | | | |
| 1. | Test Number | 200G-1 | | 200G-2 | | 201G-1 | | 201G-2 | | 201G-3 | |
| 2. | Load (K#/hr) | 41.5 | | 40.0 | | 40.0 | | 40.0 | | 39.8 | |
| 3. | Control Method Auto/Hand | HAND | | HAND | | ✓ | | ✓ | | ✓ | |
| 4. | Staged Air Port Open | NONE | | NONE | | ✓ | | ✓ | | ✓ | |
| 5. | | BASELINE | | BASELINE | | MAX $O_2$ | | MID $O_2$ | | HIGH $O_2$ | |
| 6. | Oxygen/Air Level (%) | 1.25 | | 1.6 | | 4.0 | | 2.65 | | 4.0 | |
| 7. | LINE ~~Drum~~ Pressure (psig) | 138 | | 136 | | 137 | | 137 | | 137 | |
| 8. | Final Steam Press/Temp(psig/°F) | 146 | | 145 | | 145 | | 145 | | 146 | |
| 9. | Fuel-Air Ratio Setting | | | | | | | | | | |
| 10. | Feedwater Press/Temp(psig/°F) | 270 | | 272 | | 272 | | 274 | | 275 | |
| 11. | Air Flow Primary/Secondary( ) | | | | | | | | | | |
| 12. | Air Temp Primary/Secondary(°F) | 80 | | 79 | | 80 | | 86 | | 85 | |
| 13. | Fan Setting FD/ID | 88 | 90 | 69 | 77 | 94 | 96 | 74 | 84 | 84 | 96 |
| 14. | Register Setting (%open C.C.) | 73 | | 73 | | ✓ | | ✓ | | | |
| 15. | Fuel Flow (lb/hr)* | | | | | | | | | | |
| 16. | Fuel Press/Temp (psig/°F) | 3.8 | 68 | 3.5 | 68 | 3.5 | 68 | 3.5 | 70 | 3.5 | 70 |
| 17. | Fuel Atomization Press (psig) | | | | | | | | | | |
| 18. | Pressure Furnace/Windbox (iwg) | -0.15 | 3.3 | -.2 | 2.7 | -.2 | 3.3 | -.2 | 2.95 | -.2 | 3.2 |
| 19. | Smoke Meter | | | 1 | | 0 | | 0 | | 0 | |
| 20. | Stack Temp. (°F) | | | 434 | | 452 | | 440 | | 454 | |
| 21. | Boiler Outlet Press (iwg) | -.8 | | -.75 | | -.88 | | -.8 | | -.88 | |
| 22. | Boiler Outlet Temp. (°F) | 668 | | 650 | | 670 | | 660 | | 670 | |
| 23. | Air Heater Inlet Temp.(°F) | | | | | | | | | | |
| 24. | Air Heater Outlet ~~Temp. (°F)~~ PRESS (iwg) | -2.05 | | -1.85 | | -2.2 | | -2.0 | | -2.2 | |
| 25. | Windbox Temperature (°F) 1 / 4 | 270/285 | | 275/290 | | 271/285 | | 280/292 | | 276/290 | |
| 26. | | | | | | | | | | | |
| 27. | GAS SETTINGS AUTO/MAN | 46/38 | | 41/34 | | /34 | | /34 | | /34 | |
| 28 | CONTROL SUPPLY PRESS psig | 9 | | 8.5 | | 8.5 | | 8.5 | | 8.5 | |

*Fuel Flow in lb/hr needed for efficiency calculation.

4/76
60-33

## KVB

Test No.
Engr. W.N.

CONTROL ROOM DATA

Test Number 2016-4
Date 6/2/76
Unit Number
Owner
Fuel NATURAL GAS
Location
Capacity (K#/hr) 45 K
Furnace Type C.E. VERTICAL
Burner Type RING

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 6/2/76 ⟶ | | | | | | 6/3 | | 6/3 | |
| 1. Test Number | 2016-4 | | 2016-5 | | 2016-6 | | 2006-3 | | 204-1 | |
| 2. Load (K#/hr) | 40.0 | | 39.2 | | 40.5 | | 39.0 | | 38.0 | |
| 3. Control Method Auto/Hand | HAND | | ✓ | | HAND | | ✓ | | ✓ | |
| 4. Staged Air Port Open | NONE | | ✓ | | NONE | | ✓ | | | |
| 5. | MID $O_2$ | | LOW $O_2$ | | LOW $O_2$ | | BASELINE | | SCA | |
| 6. Oxygen/Air Level (%) | 2.9 | | 1.25 | | 1.45 | | 2.7 | | 2.95 | |
| 7. Drum Pressure (psig) | 138 | | 138 | | 139 | | 136 | | 137 | |
| 8. Final Steam Press/Temp(psig/°F) | 146 | | 146 | | 148 | | 144 | | 145 | |
| 9. Fuel-Air Ratio Setting | | | | | | | | | | |
| 10. Feedwater Press/Temp(psig/°F) | 275 | | 275 | | 275 | | 270 | | 272 | |
| 11. Air Flow Primary/Secondary( ) | | | | | | | | | | |
| 12. Air Temp Primary/Secondary(°F) | 84 | | 86 | | 86 | | 64 | | 78 | |
| 13. Fan Setting FD/ID | 75 | 85 | 65 | 72 | 67 | 74 | 71 | 80 | 54 | 82 |
| 14. Register Setting (%open C.C.) | 73% | | 73 | | 73 | | 73 | | 73 | |
| 15. Fuel Flow (lb/hr)* | | | | | | | | | | |
| 16. Fuel Press/Temp (psig/°F) | 3.5 | 70 | 3.5 | 70 | 3.5 | 70 | 3.3 | 66 | 3.5 | 68 |
| 17. Fuel Atomization Press (psig) | | | | | | | | | | |
| 18. Pressure Furnace/Windbox (iwg) | -0.2 | 3.0 | -0.22 | 2.5 | -.21 | 2.6 | -.17 | 3.0 | -0.2 | 2.2 |
| 19. Smoke Meter | 0 | | | | 1 | | 0 | | 1 | |
| 20. Stack Temp. (°F) | — | | — | | 432 | | 435 | | 444 | |
| 21. Boiler Outlet Press (iwg) | -0.8 | | -0.7 | | -0.7 | | -.72 | | -.79 | |
| 22. Boiler Outlet Temp. (°F) | 665 | | 640 | | 645 | | 650 | | 650 | |
| 23. Air Heater Inlet Temp.(°F) | | | | | | | | | | |
| 24. Air Heater Outlet ~~Temp. (°F)~~ PRESS | -2.0 | | -1.75 | | -1.75 | | -1.9 | | -2.0 | |
| 25. Windbox Temperature (°F) 1 / 4 | 280/292 | | 281/294 | | 281/295 | | 267/281 | | 295/310 | |
| 26. | | | | | | | | | | |
| 27. GAS SETTING | 34 | | ✓ | | 34 | | 32 | | 32 | |
| 28. CONTROL PRESS | 8.5 | | ✓ | | 8.5 | | 8.1 | | 8.0 | |

*Fuel flow in lb/hr needed for efficiency calculation.

4/76
60-33

**KVB**

Test No. ____________

Engr. ____________

CONTROL ROOM DATA

Test Number ____________

Date 6/3/76

Unit Number ____________

Owner ____________

Fuel NATURAL GAS

Location 38

Capacity (K#/hr) 45

Furnace Type C.E. VERTICAL

Burner Type RING

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test Number | 204-2 | | 204-3 | | 204-4 | | 204-5 | | 204-6 | |
| 2. Load (K#/hr) | 38.0 | | 38.3 | | 38.5 | | 38.5 | | 38.5 | |
| 3. Control Method Auto/Hand | HAND | | HAND | | ✓ | | ✓ | | ✓ | |
| 4. Staged Air Port Open | 12 + 13 | | 10 + 11 | | 8 + 9 | | 6 + 7 | | 12 + 13 | |
| 5. | SCA | | SCA | | SCA | | SCA | | SCA | |
| 6. Oxygen/Air Level (%) | 2.6 | | 2.9 | | 3.0 | | 2.75 | | 2.7 | |
| 7. Drum Pressure (psig) | 137 | | 137 | | 138 | | 138 | | ✓ | |
| 8. Final Steam Press/Temp(psig/°F) | 145 | | 145 | | 146 | | 146 | | ✓ | |
| 9. Fuel-Air Ratio Setting | | | | | | | | | | |
| 10. Feedwater Press/Temp(psig/°F) | 272 | | 274 | | 275 | | 275 | | ✓ | |
| 11. Air Flow Primary/Secondary( )iwg | 3.3 | | 3.3 | | 3.3 | | 3.4 | | 3.5 | |
| 12. Air Temp Primary/Secondary(°F) | 81 | | 89 | | 87 | | 87 | | 84 | |
| 13. Fan Setting FD/ID | 54 | 81 | 54 | 81 | 54 | 81 | ✓ | ✓ | 54 | 83 |
| 14. Register Setting (%open C.C.) | 73% → | | | | | | | | | |
| 15. Fuel Flow (lb/hr)* | | | | | | | | | | |
| 16. Fuel Press/Temp (psig/°F) | 3.3 | 70 | 3.3 | 73 | 3.3 | 72 | 3.3 | 72 | 3.3 | 70 |
| 17. Fuel Atomization Press (psig) | | | | | | | | | | |
| 18. Pressure Furnace/Windbox (iwg) | -.2 | 2.1 | -.2 | 2.1 | -.2 | 2.1 | -.2 | 2.2 | -.2 | 2.15 |
| 19. Smoke Meter | 0 | | 0 | | 0 | | 0 | | 0 | |
| 20. Stack Temp. (°F) | 450 | | 454 | | 453 | | 452 | | — | |
| 21. Boiler Outlet Press (iwg) | -.77 | | -.77 | | -.78 | | -.78 | | -.78 | |
| 22. Boiler Outlet Temp. (°F) | 665 | | 660 | | 662 | | 660 | | 668 | |
| 23. Air Heater Inlet Temp.(°F) | | | | | | | | | | |
| 24. Air Heater Outlet ~~Temp. (°F)~~ PRESS | -1.9 | | -1.9 | | -1.9 | | -1.9 | | -1.95 | |
| 25. Windbox Temperature (°F) 1/4 | 305/316 | | 311/324 | | 310/326 | | 312/328 | | 311/325 | |
| 26. | | | | | | | | | | |
| 27. GAS CONTROL SETTING/PRESS | 31/8.1 | | 32/8.1 | | 32/8.1 | | ✓/✓ | | ✓/✓ | |
| 28. | | | | | | | | | | |

*Fuel flow in lb/hr needed for efficiency calculation.

4/76
60-33

**KVB**

Test No. 
Engr. WN

CONTROL ROOM DATA

Test Number 
Date 6/3/76, 6/4/76
Unit Number 
Owner 
Fuel NATURAL GAS
Location 
Capacity (K#/hr) 45
Furnace Type C.E. VERTICAL
Burner Type RING

| | 6/3/76 | | 6/4/76 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test Number | 200G-4 | | | | 200G-5 | | 201G-7 | | 201G-8 | |
| 2. Load (K#/hr) | 39.2 | | | | 41.0 | | 40.5 | | 40.0 | |
| 3. Control Method Auto/Hand | HAND | | | | HAND | | HAND | | HAND | |
| 4. Staged Air Port Open | NONE | | | | NONE | | NONE | | NONE | |
| 5. | BASELINE | | | | BASELINE | | $O_2$ RANGE | | $O_2$ RANGE | |
| 6. Oxygen/Air Level (%) | 2.7 | | | | 2.3 | | 2.8 | | 3.4 | |
| 7. Drum Pressure (psig) | 137 | | | | 132.5 | | 137 | | 138 | |
| 8. Final Steam Press/Temp(psig/°F) | 146 | | | | 143 | | 145 | | 146 | |
| 9. Fuel-Air Ratio Setting | | | | | | | | | | |
| 10. Feedwater Press/Temp(psig/°F) | 275 | | | | 261 | | 262 | | 262 | |
| 11. Air Flow Primary/Secondary( )iwg | 4.7 | | | | 4.8 | | 4.9 | | 5.2 | |
| 12. Air Temp Primary/Secondary(°F) | 82 | | | | 81 | | 82 | | 84 | |
| 13. Fan Setting FD/ID | 70 | 80 | | | 70 | 82 | 73 | 83 | 78 | 89 |
| 14. Register Setting (%open C.C.) | 73% → | | | | | | | | | → |
| 15. Fuel Flow (lb/hr)* | | | | | | | | | | |
| 16. Fuel Press/Temp (psig/°F) | 3.3 | 69 | | | 3.5 | 69 | 3.5 | 69 | 3.5 | 70 |
| 17. Fuel Atomization Press (psig) | | | | | | | | | | |
| 18. Pressure Furnace/Windbox (iwg) | -0.2 | 2.9 | | | -0.22 | 2.9 | -0.20 | 3.0 | -0.20 | 3.2 |
| 19. Smoke Meter | | | | | 1 | | | | | |
| 20. Stack Temp. (°F) | | | | | 436 | | 443 | | 452 | |
| 21. Boiler Outlet Press (iwg) | -.75 | | | | -.80 | | -.79 | | -.82 | |
| 22. Boiler Outlet Temp. (°F) | 650 | | | | 655 | | 660 | | 670 | |
| 23. Air Heater Inlet Temp.(°F) | | | | | | | | | | |
| 24. Air Heater Outlet ~~Temp. (°F)~~ PRESS | -1.9 | | | | -1.95 | | -2.0 | | -2.2 | |
| 25. Windbox Temperature (°F) 1 / 4 | 280/296 | | | | 275/290 | | 275/290 | | 275/294 | |
| 26. | | | | | | | | | | |
| 27. GAS SETTING/CONTROL PRESS | 32/8.2 | | | | 34/8.8 | | 34/8.7 | | 34/8.7 | |
| 28. | | | | | | | | | | |

*Fuel flow in lb/hr needed for efficiency calculation.

4/76
60-33

Test No. ______________

# KVB

Engr. ______________

## CONTROL ROOM DATA

Test Number 204-7

Date 6-4-76

Unit Number

Owner

Fuel NATURAL GAS

Location 38

Capacity (K#/hr) 45

Furnace Type C.E. VERTICAL

Burner Type RING

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test Number | 204-7 | | 204-8 | | | | | | | |
| 2. Load (K#/hr) | 39.5 | | 39.5 | | | | | | | |
| 3. Control Method Auto/Hand | HAND | | HAND | | | | | | | |
| 4. Staged Air Port Open | 6 + 7 | | 4 + 15 | | | | | | | |
| 5. | SCA | | SCA | | | | | | | |
| 6. Oxygen/Air Level (%) | 2.7 | | 2.95 | | | | | | | |
| 7. Drum Pressure (psig) | 138 | | 138 | | | | | | | |
| 8. Final Steam Press/Temp(psig/°F) | 145 | | 145 | | | | | | | |
| 9. Fuel-Air Ratio Setting | | | | | | | | | | |
| 10. Feedwater Press/Temp(psig/°F) | 266 | | 269 | | | | | | | |
| 11. Air Flow Primary/Secondary( ) iwg | 3.5 | | 3.7 | | | | | | | |
| 12. Air Temp Primary/Secondary(°F) | 88 | | 88 | | | | | | | |
| 13. Fan Setting FD/ID | 58 | 85 | 58 | 85 | | | | | | |
| 14. Register Setting (%open C.C.) | 73 → | | | | | | | | | |
| 15. Fuel Flow (lb/hr)* | | | | | | | | | | |
| 16. Fuel Press/Temp (psig/°F) | 3.5 | 71 | 3.5 | 71 | | | | | | |
| 17. Fuel Atomization Press (psig) | | | | | | | | | | |
| 18. Pressure Furnace/Windbox (iwg) | -0.2 | 2.4 | -0.2 | 2.3 | | | | | | |
| 19. Smoke Meter | | | | | | | | | | |
| 20. Stack Temp. (°F) | 463 | | 459 | | | | | | | |
| 21. Boiler Outlet Press (iwg) | -0.80 | | -0.81 | | | | | | | |
| 22. Boiler Outlet Temp. (°F) | 667 | | 660 | | | | | | | |
| 23. Air Heater Inlet Temp.(°F) | | | | | | | | | | |
| 24. Air Heater Outlet ~~Temp. (°F)~~ PRESS | -2.0 | | -2.0 | | | | | | | |
| 25. Windbox Temperature (°F) 1/4 | 305/325 | | 305/322 | | | | | | | |
| 26. | | | | | | | | | | |
| 27. GAS CONTROL SETTING/PRESS. | 34/8.9 | | 34/8.8 | | | | | | | |
| 28. | | | | | | | | | | |

*Fuel flow in lb/hr needed for efficiency calculation.

4/76
60-33

# KVB

Test No. ______

Engr. ______

## CONTROL ROOM DATA

Test Number ______

Date *6-7-76*

Unit Number ______

Owner ______

Fuel *NATURAL GAS*

Location *38*

Capacity (K#/hr) *45 K*

Furnace Type *C.E. VERTICAL*

Burner Type *RING*

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. | Test Number | 2006-6 | | 204-9 | | 204-10 | | 204-11 | | 204-12 | |
| 2. | Load (K#/hr) | 39.0 | | 39.0 | | 39.0 | | 39.0 | | 38.5 | |
| 3. | Control Method Auto/Hand | HAND | | HAND | | HAND | | HAND | | HAND | |
| 4. | Staged Air Port Open | NONE | | 14 + 15 | | 14 + 15 | | 8 + 9 | | 6 + 7 | |
| 5. | | | | SCA | | SCA | | SCA | | SCA | |
| 6. | Oxygen/Air Level (%) | 2.3 | | 2.25 | | 2.5 | | 2.4 | | 2.35 | |
| 7. | LINE ~~Drum~~ Pressure (psig) | 137 | | 136 | | 137 | | 136 | | 138 | |
| 8. | Final Steam Press/Temp(psig/°F) | 145 | | 145 | | 145 | | 145 | | 145 | |
| 9. | Fuel-Air Ratio Setting | | | | | | | | | | |
| 10. | Feedwater Press/Temp(psig/°F) | 275 | | 275 | | 276 | | 277 | | 277 | |
| 11. | Air Flow Primary/Secondary( )iwg | 4.6 | | 3.3 | | 3.3 | | 3.3 | | 3.3 | |
| 12. | Air Temp Primary/Secondary(°F) | 82 | | 81 | | 86 | | 90 | | 92 | |
| 13. | Fan Setting FD/ID | 70 | 80 | 55 | 81 | 55 | 82 | 55 | 82 | 55 | 82 |
| 14. | Register Setting (%open C.C.) | 73% → | | | | | | | | | |
| 15. | Fuel Flow (lb/hr)* | | | | | | | | | | |
| 16. | Fuel Press/Temp (psig/°F) | 3.5 | 69 | 3.5 | 68 | 3.5 | 71 | 3.5 | 72 | 3.5 | 74 |
| 17. | Fuel Atomization Press (psig) | | | | | | | | | | |
| 18. | Pressure Furnace/Windbox (iwg) | -0.2 | 2.9 | -0.2 | 2.2 | -0.2 | 2.2 | -0.2 | 2.2 | -0.2 | 2.2 |
| 19. | Smoke Meter | 0 | | 0 | | 0 | | 0 | | 0 | |
| 20. | Stack Temp. (°F) | 435 | | | | 450 | | 455 | | 459 | |
| 21. | Boiler Outlet Press (iwg) | -0.75 | | -7.5 | | -.79 | | -.79 | | -.79 | |
| 22. | Boiler Outlet Temp. (°F) | 650 | | 652 | | 654 | | 660 | | 660 | |
| 23. | Air Heater Inlet Temp.(°F) | | | | | | | | | | |
| 24. | Air Heater Outlet ~~Temp. (°F)~~ PRESS | -1.9 | | -1.9 | | -1.95 | | -1.95 | | -1.95 | |
| 25. | Windbox Temperature (°F) 1 / 4 | 275/292 | | 299/315 | | 302/318 | | 310/325 | | 315/332 | |
| 26. | | | | | | | | | | | |
| 27. | GAS SETTING / CONTROL PRESS. | 33.5/8.5 | | 33.5/8.5 | | 34/8.5 | | 34/8.5 | | 34/8.5 | |
| 28. | | | | 30.13 | | | | | | | |

*Fuel flow in lb/hr needed for efficiency calculation.

4/76
60-33

**KVB**

Test No. ________

Engr. W.N.

CONTROL ROOM DATA

Test Number ________ Date 6-7-76

Unit Number ________ Owner ________

Fuel NATURAL GAS Location ________

Capacity (K#/hr) 45

Furnace Type C E VERTICAL Burner Type RING BURNER

6/7/76

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. | Test Number | 204-13 | | 204-14 | | 204-15 | | 204-16 | | 204-17 | |
| 2. | Load (K#/hr) | 39.0 | | 39.0 | | 39.0 | | 38.5 | | 38.5 | |
| 3. | Control Method Auto/Hand | HAND | | HAND | | HAND | | HAND | | HAND | |
| 4. | Staged Air Port Open | 6 + 7 | | 6 + 7 | | 6 + 7 | | 6 + 7 | | 6 + 7 | |
| 5. | | SCA | | SCA | | SCA | | SCA | | SCA | |
| 6. | Oxygen/Air Level (%) | 1.7 | | 1.25 | | 4.1 | | 3.0 | | 1.9 | |
| 7. | Drum Pressure (psig) | 138 | | 138 | | 138 | | 140 | | 141 | |
| 8. | Final Steam Press/Temp(psig/°F) | 148 | | 146 | | 146 | | 149 | | 149 | |
| 9. | Fuel-Air Ratio Setting | | | | | | | | | | |
| 10. | Feedwater Press/Temp(psig/°F) | 276 | | 278 | | 279 | | 279 | | 279 | |
| 11. | Air Flow Primary/Secondary( ) | 3.4 | | 3.3 | | 4.0 | | 3.6 | | 3.2 | |
| 12. | Air Temp Primary/Secondary(°F) | 94 | | 94 | | 94 | | 95 | | 94 | |
| 13. | Fan Setting FD/ID | 55 | 77 | 55 | 74 | 66 | 98 | 59 | 85 | 59 | 80 |
| 14. | Register Setting (%open C.C.) | 73% → | | | | | | | | | |
| 15. | Fuel Flow (lb/hr)* | | | | | | | | | | |
| 16. | Fuel Press/Temp (psig/°F) | 3.5 | 74 | 3.5 | 74 | 3.5 | 74 | 3.5 | 74 | 3.5 | 74 |
| 17. | Fuel Atomization Press (psig) | | | | | | | | | | |
| 18. | Pressure Furnace/Windbox (iwg) | -.2 | 2.2 | -.18 | 2.2 | -.20 | 2.65 | -.20 | 2.40 | -.2 | 2.2 |
| 19. | Smoke Meter | | | | | | | | | | |
| 20. | Stack Temp. (°F) | 448 | | 444 | | 475 | | | | 460 | |
| 21. | Boiler Outlet Press (iwg) | -.71 | | -.69 | | -.89 | | -.79 | | -.75 | |
| 22. | Boiler Outlet Temp. (°F) | 645 | | 641 | | 670 | | 662 | | 655 | |
| 23. | Air Heater Inlet Temp.(°F) | | | | | | | | | | |
| 24. | Air Heater Outlet ~~Temp. (°F)~~ press. | -1.8 | | -1.75 | | -2.25 | | -2.0 | | -1.05 | |
| 25. | Windbox Temperature (°F) 1/4 | 310/325 | | 306/322 | | 310/330 | | 315/335 | | 319/337 | |
| 26. | | | | | | | | | | | |
| 27. | GAS SETTING / CONTROL PRESS. | 33.5/8.5 | | 33.5/8.5 | | 33.5/8.5 | | 33.5/8.5 | | 33.5/8.5 | |
| 28. | | | | | | | | | | | |

*Fuel flow in lb/hr needed for efficiency calculation.

4/76
60-33

356
344
350
341

# KVB

Test No. ________

Engr. ________

## CONTROL ROOM DATA

Test Number ________

Date 6-8-76

Unit Number ________

Owner ________

Fuel NATURAL GAS

Location 38

Capacity (K#/hr) 45

Furnace Type C E VERTICAL

Burner Type RING

6/8 Stm. Preheat → Full By Pass

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test Number | 2006-7 | | 205-1 | | 205-2 | | 205-3 | | 205-4 | |
| 2. Load (K#/hr) | 39.5 | | 40.0 | | 40.0 | | 40.0 | | 35.0 | |
| 3. Control Method Auto/Hand | HAND | | HAND | | HAND | | HAND | | HAND | |
| 4. Staged Air Port Open | NONE | | NONE | | NONE | | NONE | | NONE | |
| 5. | BASELINE | | VPH | | VPH | | VPH | | VPH | |
| 6. Oxygen/Air Level (%) | 2.55 | | 2.25 | | 2.2 | | 2.45 | | 2.2 | |
| 7. LINE ~~Drum~~ Pressure (psig) | 138 | | 138 | | 134.5 | | 134.5 | | 135 | |
| 8. Final Steam Press/Temp(psig/°F) | 147 | | 145 | | 143 | | 143 | | 144 | |
| 9. Fuel-Air Ratio Setting | | | | | | | | | | |
| 10. Feedwater Press/Temp(psig/°F) | 265 | | 275 | | 273 | | 274 | | 274 | |
| 11. Air Flow Primary/Secondary( ) | 4.6 | | 4.8 | | 4.7 | | 4.8 | | 2.8 | |
| 12. Air Temp Primary/Secondary(°F) | 83 | | 91 | | 92 | 198 | 93 | 198 | 95 | 430 |
| 13. Fan Setting FD/ID | 70 | 80 | 70 | 80 | 70 | 80 | 73 | 82 | 73 | 91 |
| 14. Register Setting (%open C.C.) | 73% → | | | | | | | | | |
| 15. Fuel Flow (lb/hr)* | | | | | | | | | | |
| 16. Fuel Press/Temp (psig/°F) | 3.5 | 69 | 3.4 | 70 | 3.4 | 72 | 3.4 | 73 | 3.4 | 74 |
| 17. Fuel Atomization Press (psig) | | | | | | | | | | |
| 18. Pressure Furnace/Windbox (iwg) | -.2 | 2.9 | -.2 | 2.8 | -.22 | 2.8 | -.20 | 3.0 | -.20 | 2.4 |
| 19. Smoke Meter | 1 | | | | 1 | | | | 1 | |
| 20. Stack Temp. (°F) | 440 | | 461 | | 463 | | 465 | | 533 | |
| 21. Boiler Outlet Press (iwg) | -.75 | | -.75 | | -.75 | | -.73 | | -.73 | |
| 22. Boiler Outlet Temp. (°F) | 650 | | 650 | | 649 | | 650 | | 650 | |
| 23. Air Heater Inlet Temp.(°F) | | | | | | | | | | |
| 24. Air Heater Outlet ~~Temp. (°F)~~ PRESS. | -1.9 | | -1.85 | | -1.85 | | -1.85 | | -1.9 | |
| 25. Windbox Temperature (°F) 1 / 4 | 275/290 | | 336/345 | | 344/350 | | 344/350 | | 136/145 | |
| 26. 2/3/5 | | | 340/340/358 | | 341/-/356 | | 341/ /357 | | 142/-/156 | |
| 27. GAS SETTING/CONTROL PRESSURE | 33.5/8.5 | | 33.5/8.5 | | 33.5/8.5 | | 33.5/8.3 | | 32.5/8.4 | |
| 28. | | | | | | | | | | |

*Fuel flow in lb/hr needed for efficiency calculation.

4/76
60-33

## KVB

Test No. ______
Engr. ______

CONTROL ROOM DATA

Test Number ______ Date 6-8-76
Unit Number ______ Owner ______
Fuel NATURAL GAS Location 38
Capacity (K#/hr) 45
Furnace Type C.E. VERTICAL Burner Type RING

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Full By Pass | | → | | ½ By-pass | | ½ By Pass | | | |
| 1. | Test Number | 205-5 | | 205-6 | | 205-7 | | 205/4-8 | | | |
| 2. | Load (K#/hr) | 34.6 | | 40.5 | | 39.5 | | 38.5 | | | |
| 3. | Control Method Auto/Hand | HAND | | HAND | | HAND | | HAND | | | |
| 4. | Staged Air Port Open | NONE | | NONE | | NONE | | 6 + 7 | | | |
| 5. | | VPH | | VPH | | VPH | | SCA + VPH | | | |
| 6. | Oxygen/Air Level (%) | 2.55 | | 1.7 | | 2.35 | | | | | |
| 7. | LIVE ~~Drum~~ Pressure (psig) | 136 | | 136 | | 136 | | 140 | | | |
| 8. | Final Steam Press/Temp(psig/°F) | 144 | | 144 | | 144 | | 149 | | | |
| 9. | Fuel-Air Ratio Setting | | | | | | | | | | |
| 10. | Feedwater Press/Temp(psig/°F) | 274 | | 274 | | 275 | | 279 | | | |
| 11. | Air Flow Primary/Secondary( )iwg | 2.9 | | | | 3.8 | | 2.9 | | | |
| 12. | Air Temp Primary/Secondary(°F) | 95 | | 96 | | 98 | 102 | 97 | | | |
| 13. | Fan Setting FD/ID | 76 | 96 | 85 | 98 | 74 | 84 | 59 | 88 | | |
| 14. | Register Setting (%open C.C.) | 73% → | | | | | | → | | | |
| 15. | Fuel Flow (lb/hr)* | | | | | | | | | | |
| 16. | Fuel Press/Temp (psig/°F) | 3.4 | 74 | 3.7 | 75 | 3.4 | 75 | 3.5 | 75 | | |
| 17. | Fuel Atomization Press (psig) | | | | | | | | | | |
| 18. | Pressure Furnace/Windbox (iwg) | -.20 | 2.5 | -.20 | 2.6 | -.22 | 2.7 | -.20 | 2.2 | | |
| 19. | Smoke Meter | | | 1 | | | | | | | |
| 20. | Stack Temp. (°F) | | | 545 | | 464 | | 487 | | | |
| 21. | Boiler Outlet Press (iwg) | -.75 | | -.78 | | -.80 | | -.79 | | | |
| 22. | Boiler Outlet Temp. (°F) | 656 | | 661 | | 650 | | 660 | | | |
| 23. | Air Heater Inlet Temp.(°F) | | | | | | | | | | |
| 24. | Air Heater Outlet ~~Temp. (°F)~~ PRESS. | -1.95 | | -2.0 | | -1.95 | | -2.0 | | | |
| 25. | Windbox Temperature (°F) 1 / 4 | 135/140 | | 135/140 | | 225/280 | | 240/300 | | | |
| 26. | 2 / 5 | 140/152 | | 138/150 | | 229/286 | | 240/298 | | | |
| 27. | GAS SETTING / CONTROL PRESSURE | 32.5/8.2 | | 35.5/9.1 | | 33/8.4 | | 33/8.5 | | | |
| 28. | | | | | | | | | | | |

*Fuel flow in lb/hr needed for efficiency calculation.

4/76
60-33

**KVB**

Test No. 200G-8, 9, 10, 11, 12
Engr.

CONTROL ROOM DATA

Test Number 
Date 6-9-76
Unit Number 
Owner 
Fuel GAS
Location 38
Capacity (K#/hr) 45
Furnace Type C.E. VERTICAL
Burner Type RING

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test Number | 200G-8 | | 200G-9 | | 200G-10 | | 200G-11 | | 200G-12 | |
| 2. Load (K#/hr) | 40.0 | | 40.3 | | 38.0 | | 39.5 | | 40.5 | |
| 3. Control Method Auto/Hand | HAND | | HAND | | HAND | | HAND | | HAND | |
| 4. Staged Air Port Open | NONE | | NONE | | NONE | | NONE | | NONE | |
| 5. | BASELINE | | REGISTER SETTINGS | | REGISTER SETTING CHANGE | | | | | |
| 6. Oxygen/Air Level (%) | 2.3 | | 2.35 | | | | | | | |
| 7. LIVE ~~Drum~~ Pressure (psig) | 135 | | 135 | | 135 | | 135 | | 135 | |
| 8. Final Steam Press/Temp(psig/°F) | 144 | | 144 | | 143 | | 144 | | 144 | |
| 9. Fuel-Air Ratio Setting | | | | | | | | | | |
| 10. Feedwater Press/Temp(psig/°F) | 275 | | 273 | | 274 | | 274 | | 274 | |
| 11. Air Flow Primary/Secondary( ) iwg | 4.6 | | 4.5 | | 6.0 | | 6.0 | | 5.7 | |
| 12. Air Temp Primary/Secondary(°F) | 83 | | 83 | | 88 | | 89 | | 89 | |
| 13. Fan Setting FD/ID | 72 | 82 | 72 | 82 | 83 | 69 | 83 | 82 | 97 | 98 |
| 14. Register Setting (%open C.C.) | 73.2% | | 100% | | 39.7% | | 39.7% | | 46.4% | |
| 15. Fuel Flow (lb/hr)* | | | | | | | | | | |
| 16. Fuel Press/Temp (psig/°F) | 3.5 | 70 | 3.5 | 71 | 3.5 | 72 | 3.5 | 72 | 3.5 | 72 |
| 17. Fuel Atomization Press (psig) | | | | | | | | | | |
| 18. Pressure Furnace/Windbox (iwg) | -.2 | 2.9 | -.2 | 2.75 | -.2 | 4.58 | -.45 | 4.4 | -.60 | 4.0 |
| 19. Smoke Meter | 1 | | | | | | | | | |
| 20. Stack Temp. (°F) | 434 | | 436 | | 429 | | | | 450 | |
| 21. Boiler Outlet Press (iwg) | -.80 | | -.78 | | -.65 | | -.90 | | -1.16 | |
| 22. Boiler Outlet Temp. (°F) | 650 | | 650 | | 630 | | 650 | | 665 | |
| 23. Air Heater Inlet Temp.(°F) | | | | | | | | | | |
| 24. Air Heater Outlet ~~Temp. (°F)~~ PRESS. | -1.95 | | -1.95 | | -1.6 | | -2.0 | | -2.4 | |
| 25. Windbox Temperature (°F) 1/4 | 275/290 | | 279/291 | | 279/293 | | 284/297 | | 288/300 | |
| 26. 2/5 | 275/297 | | 275/299 | | 283/301 | | 288/305 | | 291/310 | |
| 27. GAS SETTING/CONTROL PRESSURE | 34/8.7 | | 34/8.7 | | 34/8.7 | | 34/8.7 | | 34/8.7 | |
| 28. | | | | | | | | | | |

*Fuel flow in lb/hr needed for efficiency calculation.

4/76
60-33

## KVB

Test No. ____________
Engr. ____________

### CONTROL ROOM DATA

Test Number ____________ Date 6-9-76

Unit Number ____________ Owner ____________

Fuel GAS Location 38

Capacity (K#/hr) 45

Furnace Type C.E. VERTICAL Burner Type RING

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test Number | 200G-13 | | 2006-14 | | 200G-15 | | 200G-16 | | 204-18 | |
| 2. Load (K#/hr) | 40.7 | | 40.7 | | 40.5 | | 40.5 | | 40.0 | |
| 3. Control Method Auto/Hand | HAND | | HAND | | HAND | | HAND | | HAND | |
| 4. Staged Air Port Open | NONE | | NONE | | NONE | | NONE | | 14 + 15 | |
| 5. | | | | | | | | | | |
| 6. Oxygen/Air Level (%) | 1.55 | | 1.8 | | | | | | 2.25 | |
| 7. LINE ~~Drum~~ Pressure (psig) | 135 | | 135 | | 135 | | 135 | | 135 | |
| 8. Final Steam Press/Temp(psig/°F) | 144 | | 144 | | 144 | | 144 | | 144 | |
| 9. Fuel-Air Ratio Setting | | | | | | | | | | |
| 10. Feedwater Press/Temp(psig/°F) | 274 | | 274 | | 274 | | 274 | | 275 | |
| 11. Air Flow Primary/Secondary( ) iwg | 5.7 | | 5.5 | | 5.5 | | 5.3 | | 3.4 | |
| 12. Air Temp Primary/Secondary(°F) | 92 | | 93 | | 94 | | 98 | | 96 | |
| 13. Fan Setting FD/ID | 97 | 84 | 97 | 81 | 97 | 87 | 97 | 85 | 58 | 83 |
| 14. Register Setting (%open C.C.) | 46.4% | | 53.1% | | 53.1% | | 59.8% | | 73.2% | |
| 15. Fuel Flow (lb/hr)* | | | | | | | | | | |
| 16. Fuel Press/Temp (psig/°F) | 3.5 | 72 | 3.5 | 73 | 3.5 | 74 | 3.5 | 75 | 3.5 | 75 |
| 17. Fuel Atomization Press (psig) | | | | | | | | | | |
| 18. Pressure Furnace/Windbox (iwg) | -.35 | 4.0 | -.20 | 3.8 | -.30 | 3.75 | -.20 | 3.5 | -.20 | 2.25 |
| 19. Smoke Meter | | | | | | | | | | |
| 20. Stack Temp. (°F) | 443 | | 441 | | 448 | | 449 | | 450 | |
| 21. Boiler Outlet Press (iwg) | -.90 | | -.75 | | -.90 | | -.79 | | -.75 | |
| 22. Boiler Outlet Temp. (°F) | 661 | | 665 | | 670 | | 665 | | 653 | |
| 23. Air Heater Inlet Temp.(°F) | | | | | | | | | | |
| 24. Air Heater Outlet ~~Temp. (°F)~~ PRESS. | -2.0 | | -1.9 | | -2.1 | | -2.0 | | -1.9 | |
| 25. Windbox Temperature (°F) 1/4 | 295/300 | | 290/299 | | 295/300 | | 290/300 | | 310/325 | |
| 26. 2/5 | 292/308 | | 290/302 | | 293/294 | | 294/306 | | 310/329 | |
| 27. GAS SETTING/CONTROL PRESS | 34/8.8 | | 34/8.7 | | 34/8.7 | | 34/8.7 | | 34/8.8 | |
| 28. | | | | | | | | | | |

*Fuel flow in lb/hr needed for efficiency calculation.

4/76
60-33

# KVB

Test No. ____________

Engr. ____________

## CONTROL ROOM DATA

Test Number ____________ Date ____________

Unit Number ____________ Owner ____________

Fuel GAS Location 38

Capacity (K#/hr) 45

Furnace Type C.E. VERTICAL Burner Type RING

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 6-9-76 | | 6-9-76 | | 6-10-76 → | | | | | |
| 1. Test Number | 204-19 | | 204-20 | | 200G-17 | | 200G-17E | | 204-21 | |
| 2. Load (K#/hr) | 39.8 | | 40.0 | | 39.5 | | 40.0 | | 39.6 | |
| 3. Control Method Auto/Hand | HAND | | HAND | | HAND | | ✓ | | HAND | |
| 4. Staged Air Port Open | 14 + 15 | | 14 + 15 | | NONE | | ✓ | | 14 + 15 | |
| 5. | | | | | BASELINE | | ✓ | | SCA | |
| 6. Oxygen/Air Level (%) | 3.45 | | 2.8 | | 2.2 | | | | | |
| 7. LINE ~~Drum~~ Pressure (psig) | 135.5 | | 135.5 | | 135 | | ✓ | | 135 | |
| 8. Final Steam Press/Temp(psig/°F) | 144 | | 144 | | 144 | | 144 | | 143 | |
| 9. Fuel-Air Ratio Setting | | | | | | | | | | |
| 10. Feedwater Press/Temp(psig/°F) | 275 | | 275 | | 274 | | ✓ | | 274 | |
| 11. Air Flow Primary/Secondary( )iwg | 3.8 | | 3.5 | | 4.5 | | 4.5 | | 3.3 | |
| 12. Air Temp Primary/Secondary(°F) | 98 | | 98 | | 88 | | 92 | | 94 | |
| 13. Fan Setting FD/ID | 65 | 90 | 60 | 86 | 71 | 80 | ✓ | ✓ | 58 | 84 |
| 14. Register Setting (%open C.C.) | 73.2 | | 73.2 | | 73.2 | | ✓ | | 73.2 | |
| 15. Fuel Flow (lb/hr)* | | | | | | | | | | |
| 16. Fuel Press/Temp (psig/°F) | 3.5 | 75 | 3.5 | 75 | 3.5 | 72 | 3.5 | 76 | 3.5 | 76 |
| 17. Fuel Atomization Press (psig) | | | | | | | | | | |
| 18. Pressure Furnace/Windbox (iwg) | -.2 | 2.5 | -.2 | 2.3 | -.2 | 2.85 | -.22 | 2.80 | -.19 | 2.2 |
| 19. Smoke Meter | | | | | | | | | | |
| 20. Stack Temp. (°F) | 455 | | 456 | | 434 | | | | 450 | |
| 21. Boiler Outlet Press (iwg) | -.81 | | -.80 | | -.75 | | -.75 | | -.78 | |
| 22. Boiler Outlet Temp. (°F) | 660 | | 655 | | 650 | | 651 | | 657 | |
| 23. Air Heater Inlet Temp.(°F) | | | | | | | | | | |
| 24. Air Heater Outlet ~~Temp. (°F)~~ PRESS. | -2.05 | | -2.0 | | -1.9 | | -1.9 | | -2.0 | |
| 25. Windbox Temperature (°F) 1/4 | 310/325 | | 310/325 | | 278/293 | | 281/296 | | 306/321 | |
| 26. 2/5 | 306/331 | | 310/335 | | 276/301 | | /288 | | 306/327 | |
| 27. GAS SETTING/CONTROL PRESS. | 34/8.7 | | 34/8.7 | | 34/8.9 | | | | 34/8.8 | |
| 28. | | | | | | | | | | |

*Fuel flow in lb/hr needed for efficiency calculation.

4/76
60-33

## KVB

Test No. ____________

Engr. ____________

### CONTROL ROOM DATA

Test Number 204-22

Date 6/10/76

Unit Number ____________

Owner ____________

Fuel NATURAL GAS

Location 38

Capacity (K#/hr) 45

Furnace Type CE VERTICAL

Burner Type RING

6/10/76

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. | Test Number | 204-22 | | 204/5-23 | | 204/5-24 | | -25 | | -26 | |
| 2. | Load (K#/hr) | 39.6 | | 39.0 | | 39.0 | | 39.0 | | 39.4 | |
| 3. | Control Method Auto/Hand | HAND | | ✓ | | ✓ | | ✓ | | ✓ | |
| 4. | Staged Air Port Open | 12 + 13 | | 12 + 13 | | 14 + 15 | | 14+15, 12+13 1/3 | | 14+15, 12+13 FO | |
| 5. | | SCA | | Bypass Full Open → | | | | | | | |
| 6. | Oxygen/Air Level (%) | 2.75 | | | | | | | | | |
| 7. | LINE ~~Drum~~ Pressure (psig) | 135 | | 135 | | ✓ | | ✓ | | 135 | |
| 8. | Final Steam Press/Temp(psig/°F) | 143 | | 143 | | ✓ | | ✓ | | 143 | |
| 9. | Fuel-Air Ratio Setting | | | | | | | | | | |
| 10. | Feedwater Press/Temp(psig/°F) | 273 | | 272 | | ✓ | | ✓ | | 275 | |
| 11. | Air Flow Primary/Secondary( )iwg | 3.3 | | 2.1 Bypass | | 2.1 Bypass | | | | 1.8 Bypass | |
| 12. | Air Temp Primary/Secondary(°F) | 96 | | 100 | | 100 | | 100 | | 100 | |
| 13. | Fan Setting FD/ID | 58 | 86 | 58 | 99 | ✓ | ✓ | ✓ | ✓ | 58 | 99 |
| 14. | Register Setting (%open C.C.) | 73.2% | | 73 | | ✓ | | | | 73.2 | |
| 15. | Fuel Flow (lb/hr)* | | | | | | | | | | |
| 16. | Fuel Press/Temp (psig/°F) | 3.5 | 76 | 3.5 | 78 | ✓ | ✓ | ✓ | 79 | 3.5 | 78 |
| 17. | Fuel Atomization Press (psig) | | | | | | | | | | |
| 18. | Pressure Furnace/Windbox (iwg) | -.20 | 2.2 | -.20 | 1.8 | -.22 | 1.8 | -.17 | 1.8 | -.15 | 1.6 |
| 19. | Smoke Meter | | | 1 | | | | | | 1 | |
| 20. | Stack Temp. (°F) | 458 | | 553 | | 547 | | | | 565 | |
| 21. | Boiler Outlet Press (iwg) | -.82 | | -.78 | | -.81 | | -.73 | | -.75 | |
| 22. | Boiler Outlet Temp. (°F) | 675 | | 672 | | 660 | | 662 | | 685 | |
| 23. | Air Heater Inlet Temp.(°F) | | | | | | | | | | |
| 24. | Air Heater Outlet ~~Temp. (°F)~~ PRESS. | -2.0 | | -2.0 | | -2.05 | | -2.0 | | -2.0 | |
| 25. | Windbox Temperature (°F) 1/4 | 318/330 | | 144/151 | | 141/150 | | 139/149 | | 139/145 | |
| 26. | 2/5 | 320/325 | | 155/146 | | 154/144 | | 152/143 | | 142/152 | |
| 27. | GAS SETTING/CONTROL PRESSURE | 34/8.9 | | 34/8.8 | | ✓ | | | | 34/8.9 | |
| 28. | | | | | | | | | | | |

*Fuel flow in lb/hr needed for efficiency calculation.

4/76
60-33

**KVB**

Test No. ____________
Engr. ____________

CONTROL ROOM DATA

Test Number ____________
Date 6-10-76
Unit Number ____________
Owner ____________
Fuel NAT. GAS
Location 38
Capacity (K#/hr) 45
Furnace Type CE VERTICAL
Burner Type ____________

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Test Number | 204/5-27 | | 204/5-28 | | 204/5-29 | | VERY SLIGHT BOILER VIBRATION<br>204/5-30 | | -31 | |
| 2. Load (K#/hr) | 39.0 | | 39.5 | | 39.0 | | 39.0 | | 39.0 | |
| 3. Control Method Auto/Hand | HAND | | HAND | | HAND | | HAND | | ✓ | |
| 4. Staged Air Port Open | 14+15 OPEN<br>(12+13) ½ OPEN | | ½ (6+7) | | 6+7 OPEN | | 6+7 | | 6+7 FULL OPEN | |
| 5. | (6+7) ⅓ | | 14+15 | | 14+15 OPEN | | 14+15 | | 14+15 ⅓ OPEN | |
| 6. Oxygen/Air Level (%) | | | | | | | | | | |
| 7. ~~Drum~~ LIVE Pressure (psig) | 134 | | 134 | | 136.5 | | 137 | | ✓ | |
| 8. Final Steam Press/Temp(psig/°F) | 143 | | 145 | | 146 | | 145 | | ✓ | |
| 9. Fuel-Air Ratio Setting | | | | | | | | | | |
| 10. Feedwater Press/Temp(psig/°F) | 275 | | 272 | | 280 | | 277 | | ✓ | |
| 11. Air Flow Primary/Secondary( ) | 1.8 | | 1.8 | | 1.8 | | 1.8 | | 2.1 | |
| 12. Air Temp Primary/Secondary(°F) | 98 | | 93 | | 92 | | 92 | | 92 | |
| 13. Fan Setting FD/ID | 48 | 98 | 48 | 98 | 48 | 98 | 44 | 98 | 46 | 98 |
| 14. Register Setting (%open C.C.) | 73.2 | | 73.2 | | 73.2 | | 73.2 | | ✓ | |
| 15. Fuel Flow (lb/hr)* | | | | | | | | | | |
| 16. Fuel Press/Temp (psig/°F) | 3.5 | 76 | 3.6 | 75 | 3.6 | 75 | 3.6 | 75 | 3.5 | 75 |
| 17. Fuel Atomization Press (psig) | | | | | | | | | | |
| 18. Pressure Furnace/Windbox (iwg) | -.14 | 1.6 | -.15 | 1.65 | -.10 | 1.75 | -.14 | 1.6 | -.2 | 1.65 |
| 19. Smoke Meter | | | | | | | | | | |
| 20. Stack Temp. (°F) | | | | | 556 | | | | | |
| 21. Boiler Outlet Press (iwg) | -.72 | | -.72 | | -.70 | | -.74 | | .78 | |
| 22. Boiler Outlet Temp. (°F) | 671 | | 675 | | 678 | | 680 | | 676 | |
| 23. Air Heater Inlet Temp.(°F) | | | | | | | | | | |
| 24. Air Heater Outlet ~~Temp. (°F)~~ PRESSURE (iwg) | -2.0 | | -2.0 | | -2.0 | | -2.0 | | -2.1 | |
| 25. Windbox Temperature (°F) 1/4 | 140/145 | | 130/140 | | 130/140 | | 130/140 | | 130/139 | |
| 26. 2/5 | 140/150 | | 134/147 | | 133/144 | | 134/135 | | 144/132 | |
| 27. GAS SETTING/CONTROL PRESSURE | 34/8.9 | | 34/9.0 | | 34/9.0 | | 34/9.0 | | ✓/8.9 | |
| 28. | | | | | | | | | | |

*Fuel flow in lb/hr needed for efficiency calculation.

4/76
60-33

## KVB

Test No. ______________

Engr. ______________

CONTROL ROOM DATA

Test Number ______________ Date 6/10/76, 6/11/76

Unit Number ______________ Owner ______________

Fuel NAT. GAS Location 38

Capacity (K#/hr) 45

Furnace Type C E VERTICAL Burner Type RING

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 6/10/76 | | 6/11/76 | | 6/11/76 → | | | | | |
| 1. Test Number | 204/5-32 | | 200G-18 | | 200G-19 | | 200G-20 | | 200G-21 | |
| 2. Load (K#/hr) | 39.2 | | 39.5 | | 39.5 | | 39.5 | | 39.5 | |
| 3. Control Method Auto/Hand | HAND | | HAND | | HAND | | HAND | | HAND | |
| 4. Staged Air Port Open | 6+7 | | NONE | | NONE | | NONE | | NONE | |
| 5. | | | | | | | | | | |
| 6. Oxygen/Air Level (%) | | | 2.65 | | 1.98 | | 2.8 | | 4.05 | |
| 7. Drum Pressure (psig) | 137 | | 134.5 | | 136 | | 136.5 | | 130.5 | |
| 8. Final Steam Press/Temp(psig/°F) | 145 | | 144 | | 145 | | 145 | | 144 | |
| 9. Fuel-Air Ratio Setting | | | | | | | | | | |
| 10. Feedwater Press/Temp(psig/°F) | 278 | | 273 | | 262 | | 267 | | 269 | |
| 11. Air Flow Primary/Secondary( ) | 1.8 | | 4.5 | | 4.0 | | 4.5 | | 5.0 | |
| 12. Air Temp Primary/Secondary(°F) | 91 | | 89 | | 91 | | 94 | | 96 | |
| 13. Fan Setting FD/ID | 54 | 100 | 70 | 78 | 68 | 77 | 72 | 82 | 97 | 93 |
| 14. Register Setting (%open C.C.) | | | | | 100% | | 100% | | 100% | |
| 15. Fuel Flow (lb/hr)* | | | | | | | | | | |
| 16. Fuel Press/Temp (psig/°F) | 3.5 | 75 | 3.4 | 73 | 3.4 | 73 | 3.4 | 74 | 3.4 | |
| 17. Fuel Atomization Press (psig) | | | | | | | | | | |
| 18. Pressure Furnace/Windbox (iwg) | -.2 | +1.8 | -.2 | +2.7 | -.22 | +2.4 | -.19 | 2.65 | -.2 | 2.95 |
| 19. Smoke Meter | | | 1 | | | | | | | |
| 20. Stack Temp. (°F) | | | 425 | | 425 | | 430 | | | |
| 21. Boiler Outlet Press (iwg) | -.8 | | -.70 | | -.76 | | -.75 | | -.85 | |
| 22. Boiler Outlet Temp. (°F) | 676 | | 645 | | 642 | | 650 | | 660 | |
| 23. Air Heater Inlet Temp.(°F) | | | | | | | | | | |
| 24. Air Heater Outlet ~~Temp. (°F)~~ PRESSURE iwg | -2.0 | | -1.8 | | -1.8 | | -1.9 | | -2.15 | |
| 25. Windbox Temperature (°F) 1/4 | 129/138 | | 282/295 | | 285/299 | | 286/300 | | 285/300 | |
| 26. 2/5 | 143/132 | | 287/291 | | 290/296 | | 290/296 | | 290/296 | |
| 27. GAS SETTING/CONTROL PRESSURE | 34/9 | | 33.5/8.5 | | 33.5/8.5 | | 33/8.5 | | 33/8.4 | |
| 28. | | | | | | | | | | |

*Fuel flow in lb/hr needed for efficiency calculation.

4/76
60-33

**KVB**

Test No. ____

Engr. ____

CONTROL ROOM DATA

Test Number ____ Date 6/11/76

Unit Number ____ Owner ____

Fuel NAT. GAS Location 38

Capacity (K#/hr) 45

Furnace Type CE VERTICAL Burner Type RING

6/11/76 →

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1. Test Number | 2006-22 | | 2006-23 | | | | |
| 2. Load (K#/hr) | 39.5 | | 39.4 | | | | |
| 3. Control Method Auto/Hand | HAND | | ✓ | | | | |
| 4. Staged Air Port Open | NONE | | ✓ | | | | |
| 5. | | | | | | | |
| 6. Oxygen/Air Level (%) | | | | | | | |
| 7. Line ~~Drum~~ Pressure (psig) | 136.5 | | ✓ | | | | |
| 8. Final Steam Press/Temp(psig/°F) | 145 | | ✓ | | | | |
| 9. Fuel-Air Ratio Setting | | | | | | | |
| 10. Feedwater Press/Temp(psig/°F) | 265 | | 275 | | | | |
| 11. Air Flow Primary/Secondary( ) | 4.2 | | 4.0 | | | | |
| 12. Air Temp Primary/Secondary(°F) | 100 | | 101 | | | | |
| 13. Fan Setting FD/ID | 70 | 78 | 67 | 74 | | | |
| 14. Register Setting (%open C.C.) | 100% | | 100% | | | | |
| 15. Fuel Flow (lb/hr)* | | | | | | | |
| 16. Fuel Press/Temp (psig/°F) | 3.4 | 76 | 3.4 | 78 | | | |
| 17. Fuel Atomization Press (psig) | | | | | | | |
| 18. Pressure Furnace/Windbox (iwg) | -.2 | 2.5 | -.2 | 2.4 | | | |
| 19. Smoke Meter | | | | | | | |
| 20. Stack Temp. (°F) | | | | | | | |
| 21. Boiler Outlet Press (iwg) | -.71 | | -.70 | | | | |
| 22. Boiler Outlet Temp. (°F) | 643 | | 640 | | | | |
| 23. Air Heater Inlet Temp.(°F) | | | | | | | |
| 24. Air Heater Outlet ~~Temp. (°F)~~ Pressure iwg | -1.85 | | -1.76 | | | | |
| 25. Windbox Temperature (°F) 1/4 | 294/305 | | 295/306 | | | | |
| 26. 2/5 | 396/302 | | 303/298 | | | | |
| 27. GAS SETTING/CONTROL PRESSURE | 33/8.4 | | ✓/✓ | | | | |
| 28. | | | | | | | |

*Fuel flow in lb/hr needed for efficiency calculation.

4/76
60-33

## Location 38

## Fuel Gas Analysis

| Gas | Concentration, % by Volume |
|---|---|
| Methane | 96.99 |
| Ethane | 1.98 |
| Propane | 0.10 |
| Butanes | .04 |
| Pentanes | .01 |
| Hexanes | .00 |
| | |
| Carbon Dioxide | .60 |
| Oxygen | .00 |
| Nitrogen | .28 |
| Water Vapor | .00 |

Higher Heating Value = 1,011 Btu/SCF

Location 38

Fuel Oil Analysis

| TESTS | | RESULTS | |
|---|---|---|---|
| | | LAB.NO.G3393 | LAB.NO.G3430 |
| Gravity,API @ 60°F | | 15.2 | 15.2 |
| Flash,PM CC | | 214°F | 218°F |
| Visc.,SU @ 160°F | | 359sec. | 358sec. |
| Visc.SU @ 220°F | | 118sec. | 119sec. |
| Sulfur,ASTM | | 1.88% | 1.88% |
| B.T.U. per pound | net | 17425 | 17462 |
| | gross | 18449 | 18484 |
| Carbon | | 86.21% | 86.26% |
| Hydrogen | | 11.22% | 11.20% |
| Nitrogen | | 0.32% | 0.30% |
| Oxygen | | 0.34% | 0.29% |
| Ash | | 0.03% | 0.07% |

PLANT 38
LOCATION 38
OPERATOR R.P. & G.C.
DATE 5-7-77
RUN NO. 201-7
SAMPLE BOX NO.
METER BOX NO.
METER H 1.72
C FACTOR @ 0.9

METHOD 5 CONTROL CONSOLE READINGS

AMBIENT TEMPERATURE
BAROMETRIC PRESSURE 24.30
ASSUMED MOISTURE, % 11.0
HEATER BOX SETTING
PROBE LENGTH, IN. 72" 304
NOZZLE DIAMETER, IN. 3/8
PROBE HEATER SETTING
UPPER LOCATION

SCHEMATIC OF STACK CROSS SECTION

| Traverse Point Number | Sampling Time (e)Min. | Static Pressure ($P_s$), In. Hg. | Stack Temperature ($T_s$) °F | Velocity Head ($P_s$) | Pressure Differential Across Orifice Meter ($\Delta H$), In. $H_2O$ | Gas Sample Volume ($V_m$) $ft^3$ | Gas Sample Temperature at Dry Gas Meter | | Sample Box Temprtature °F | Temperature of Gas Leaving Condenser on Last Impinger °F |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Inlet ($T_{min.}$) °F | Outlet ($T_{mout}$) °F | | |
| 20" | 1653 | −0.21 | 420 | .25 | 1.1 | 803.4007 | 74 | 76 | 320 | 50 |
| INSIDE STACK | 1708 | | 420 | .25 | 1.1 | 812.9000 | 90 | 78 | 320 | 50 |
| | 1720 | | 420 | .25 | 1.1 | 820.1000 | 100 | 82 | 320 | 50 |
| | 1735 | | 420 | .25 | 1.1 | 828.6000 | 102 | 88 | 320 | 50 |
| | 1810 | | 420 | .25 | 1.1 | 850.5000 | 115 | 98 | 320 | 60 |
| | 1834 | | 420 | .25 | 1.1 | 864.4007 | 115 | 100 | 320 | 50 |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| TOTAL | | | | | | 61.0000 | 99 | 87<br>AVG. | AVG. | |
| AVERAGE | | | 420 | .25 | 1.1 | | 93 | AVG. | 320 | 50 |

# PARTICULATE CALCULATION SHEET

Test No. 201-7 Date 5-7-76 Location 38 Test Crew RP
Box No. Sample Probe Position 20" INSIDE OF DUCT
Test Description

Dry Gas Meter Vol. ($ft^3$)
Final
Initial
Total

Impinger Water Vol (ml)

| | 1 | 2 | 3 | S. Gel | Total |
|---|---|---|---|---|---|
| Final | 345 | 58 | 2 | 659.2 | |
| Initial | 100 | 100 | 0 | 646.6 | |
| Δ Vol | 245 | -42 | 2 | 12.6 | 217.6 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Beaker No. | 2 | 1 | | | | Filter No. 1 | Blank No. |
| Date Weighed | | | | | | | |
| Tare Wt. 1 | 84.6649 | 85.9114 | | | | .6886 | |
| 2 | 84.6582 | 85.9113 | | | | .6886 | |
| 3 | 84.6571 | | | | | .6886 | |
| 4 | | | | | | | |
| 5 | | | | | | | |
| 6 | | | | | | | |
| Avg | 84.6601 | 85.9114 | | | | .6886 | |
| Bottle No. | | | | | | | |
| Content | Impinger (Water) | Probe (Acetone) | Probe (Water) | Cyclone (Acetone) | Flask (Dry) | | |
| Rinse (ml) | | | | | | | |
| Date Weighed or 250 Bake | | | | | | | |
| Final Wt. 250 1 | 84.8751 | 86.1104 | | | | .8641 | |
| 2 | 84.8751 | 86.1104 | | | | .8641 | |
| 3 | | | | | | .8641 | |
| 4 | | | | | | | |
| 5 | | | | | | | |
| 6 | | | | | | | |
| Avg | 84.8751 | 86.1104 | | | | .8641 | |
| Residue wt Final 250-Tare | .2150 | .1990 | | | | .1755 | |
| Date Weighed or 650 Bake | | | | | | | |
| Final Wt. 650 1 | | | | | | | |
| 2 | | | | | | | |
| 3 | | | | | | | |
| 4 | | | | | | | |
| 5 | | | | | | | |
| 6 | | | | | | | |
| Avg | | | | | | | |
| Residue Wt Final 650-Tare | | | | | | | |

Comments:

Data Sheet 6002-3

LOW AIR

## PARTICULATE EMISSION CALCULATIONS

Test No. 201-7 Date 5-7-76 Location 38 Engr. R.P.

Unit No. 2 Fuel #6 Sampling Train and Method METHOD #5

Pitot Factor, Fs .89 Barometric Pressure, $P_{bar}$ 29.30 in. Hg

Tot. Liquid Collected, $V_{1c}$ 217.6 ml Total Particulate, $M_n$ 589.5 m gm

Velocity Head, ΔP 0.35 iwg Stack Temp., Ts 880 °R Stack Area, As 11.0 $ft^2$

Sample Volume, Vm 61 $ft^3$ Stack Press., Psg -0.01 iwg Excess $O_2$, $XO_2$% 2 6 %

Orifice Press. Diff., H 1.1 iwg Stack Gas Sp. Gravity, Gs 1.05 n.d.

Sample Time, θ 101 min Nozzle Dia., Dn 3/8 in. Meter Temp., $T_m$ 553 °R

*1. Sample Gas Volume $Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$ 59.86 SCF

2. Water Vapor $Vw_{std} = 0.0474\ V_{1c}$ 10.31 SCF

3. Moisture Content Bwo = Eq. 2/(Eq. 1 + Eq. 2) 0.1469 N.D.

4. Concentration a. $C = 0.0154\ Mn/Vm_{std}$ 0.1517 grains/DSCF

b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$ .00002171 lb/DSCF

c. $C = \text{Eq. 4b} \times 16.018 \times 10^3$ 0.3476 grams/DSCM

5. Abs. Stack Press. $Ps = P_{bar} \times 13.6 + Psg$ 398.2 in. w abs.

6. Stack Gas Speed $Vs = 174\ Fs \sqrt{\Delta P Ts} \sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$ 2264 ft/min

7. Stack Gas Flow Rate @ 70°F a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$ 14,708 WSCF/min

b. Qsd = Eq. 7a x (1. - Eq. 3) 12,548 DSCF/min

8. Material Flow Ms = Eq. 7b x Eq. 4b x 60 16.34 lb/hr

9. $XO_2$ factor $XO_2f = 2090/(20.9 - XO_2\%)$ 114.2 N.D.

10. Emission a. E = Eq. 4b x Fe x Eq. 9 .2285 lb/MMBtu

b. E = Eq. 4c x Fm x Eq. 9 x 1000 98.25 ng/joule

11. % Isokinetic $I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$ 68 %

| | Oil | Gas | Coal |
|---|---|---|---|
| Fe SC Feet/$10^4$ Btu | 92.2 | 87.4 | 98.2 |
| Fm SC Meters/$10^4$ joules | 0.002475 | 0.002346 | 0.002636 |

*Multiply $Vm_{std}$ by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

PLANT
LOCATION 38
OPERATOR RP, Sr
DATE MAY 12, 1976
RUN NO. 200-14
SAMPLE BOX NO.
METER BOX NO. EN-45-1
METER H 1.72
C FACTOR @ 0.84

## METHOD 5 CONTROL CONSOLE READINGS

SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE
BAROMETRIC PRESSURE 29.27
ASSUMED MOISTURE, % 10
HEATER BOX SETTING
PROBE LENGTH, IN. 6 ft. Joy
NOZZLE DIAMETER, IN. 3/8"
PROBE HEATER SETTING

CONCENTRATION

| Traverse Point Number | Sampling Time (e)Min. | Static Pressure $(P_s)$, ~~In. Hg.~~ iwg | Stack Temperature $(T_s)$ °F | Velocity Head $(P_s)$ | Pressure Differential Across Orifice Meter $(\Delta H)$, In. $H_2O$ | Gas Sample Volume $(V_m)$ ft$^3$ | Gas Sample Temperature at Dry Gas Meter: Inlet $(T_{min.})$ °F | Gas Sample Temperature at Dry Gas Meter: Outlet $(T_{mout})$ °F | Sample Box Temprtature °F | Temperature of Gas Leaving Condenser on Last Impinger °F |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 0.09 | 350 | .25 | 1.25 | 904.6020 | 62 | 58 | 320 | 50 |
| | 13 | ↓ | 370 | .26 | 1.25 | 912.6000 | 70 | 60 | 320 | 55 |
| | 15 | | 375 | .25 | 1.25 | 922.1000 | 77 | 66 | 320 | 60 |
| | 15 | | 390 | .25 | 1.25 | 931.6000 | 75 | 68 | 310 | 60 |
| | 15 | | 395 | .25 | 1.25 | 941.4000 | 72 | 67 | 320 | 60 |
| | 15 | | 392 | .25 | 1.25 | 951.1000 | 73 | 67 | 320 | 60 |
| | 15 | | 385 | .25 | 1.25 | 960.6000 | 73 | 66 | 320 | 57 |
| | 8 | ↓ | 385 | .25 | 1.25 | 965.6020 | 76 | 67 | 320 | 60 |
| | | | | | | | | | | |
| | | | NOTE: ALL OTHER $T_s$ MEASUREMENTS ARE 420-430 °F. THESE MUST BE IN ERROR | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| TOTAL | 96 | | | | | 61.0000 | | 64.88 AVG. | | |
| AVERAGE | | | 380 | | | | 72.25 | AVG. 68 | AVG. | |

## PARTICULATE CALCULATION SHEET

Test Crew F.C.
Test No. 200-14 Date 5/12/76 Location 38
Box No. Sample Probe Position
Test Description

Dry Gas Meter Vol. (ft$^3$)
Final
Initial
Total

Impinger Water Vol (ml)

| | 1 | 2 | 3 | S. Gel | Total |
|---|---|---|---|---|---|
| Final | 240 | 81 | 1 | | |
| Initial | 100 | 100 | 0 | | |
| Δ Vol | 140 | -19 | 1 | | 136.5 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Beaker No. | 4 | | 3 | | | Filter No. 2 | Blank No. |
| Date Weighed | | | | | | | |
| Tare Wt. 1 | 102.0466 | | 103.1887 | | | .6871 | |
| 2 | 102.0455 | | 103.1898 | | | .6871 | |
| 3 | | | | | | | |
| 4 | | | | | | | |
| 5 | | | | | | | |
| 6 | | | | | | | |
| Avg | 102.0460 | | 103.1892 | | | .6871 | |
| Bottle No. | | | | | | | |
| Content | Impinger (Water) | Probe (Acetone) | Probe (Water) | Cyclone (Acetone) | Flask (Dry) | | |
| Rinse (ml) | | | | | | | |
| Date Weighed or 250 Bake | | | | | | | |
| Final Wt. 250 1 | 102.2178 | | 103.3032 | | | .8552 | |
| 2 | 102.2178 | | 103.3032 | | | .8563 | |
| 3 | | | | | | | |
| 4 | | | | | | | |
| 5 | | | | | | | |
| 6 | | | | | | | |
| Avg | 102.2178 | | 103.3032 | | | .8558 | |
| Residue wt Final 250-Tare | .1718 | | .1140 | | | .1687 | |
| Date Weighed or 650 Bake | | | | | | | |
| Final Wt. 650 1 | | | | | | | |
| 2 | | | | | | | |
| 3 | | | | | | | |
| 4 | | | | | | | |
| 5 | | | | | | | |
| 6 | | | | | | | |
| Avg | | | | | | | |
| Residue Wt Final 650-Tare | | | | | | | |

Comments:

Data Sheet 6002-3

BASELINE

# PARTICULATE EMISSION CALCULATIONS

Test No. 205-14 Date 5/12/76 Location 38 Engr. FF

Unit No. ______ Fuel #6 Sampling Train and Method ______

Pitot Factor, Fs 0.89 Barometric Pressure, $P_{bar}$ 29.27 in. Hg

Tot. Liquid Collected, $V_{1c}$ 136.5 ml Total Particulate, $M_n$ 454.5 mgm

Velocity Head, ΔP 0.25 iwg Stack Temp., Ts 880 °R Stack Area, As 11.0 $ft^2$

Sample Volume, Vm 61 $ft^3$ Stack Press., Psg 0.09 iwg Excess $O_2$, $XO_2$% 2.6 %

Orifice Press. Diff., H 1.25 iwg Stack Gas Sp. Gravity, Gs 1.05 n.d.

Sample Time, θ 96 min Nozzle Dia., Dn 3/8 in. Meter Temp., $T_m$ ______ °R

*1. Sample Gas Volume $Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$ 59.82 SCF

2. Water Vapor $Vw_{std} = 0.0474\ V_{1c}$ 6.47 SCF

3. Moisture Content Bwo = Eq. 2/(Eq. 1 + Eq. 2) 0.098 N.D.

4. Concentration a. $C = 0.0154\ Mn/Vm_{std}$ 0.1170 grains/DSCF

b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$ 0.00001675 lb/DSCF

c. $C = \text{Eq. 4b} \times 16.018 \times 10^3$ 0.2683 grams/DSCM

5. Abs. Stack Press. $Ps = P_{bar} \times 13.6 + Psg$ 400.7 in. w abs.

6. Stack Gas Speed $Vs = 174\ Fs\ \sqrt{\Delta P Ts}\ \sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$ 2259 ft/min

7. Stack Gas Flow Rate @ 70°F a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$ 14734 WSCF/min

b. $Qsd = \text{Eq. 7a} \times (1. - \text{Eq. 3})$ 13290 DSCF/min

8. Material Flow $Ms = \text{Eq. 7b} \times \text{Eq. 4b} \times 60$ 13.36 lb/hr

9. $XO_2$ factor $XO_2f = 2090/(20.9 - XO_2\%)$ 114.2 N.D.

10. Emission a. $E = \text{Eq. 4b} \times Fe \times \text{Eq. 9}$ .1764 lb/MMBtu

b. $E = \text{Eq. 4c} \times Fm \times \text{Eq. 9} \times 1000$ 75.83 ng/joule

11. % Isokinetic $I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$ 67 %

| | Oil | Gas | Coal |
|---|---|---|---|
| Fe SC Feet/$10^4$ Btu | 92.2 | 87.4 | 98.2 |
| Fm SC Meters/$10^4$ joules | 0.002475 | 0.002346 | 0.002636 |

*Multiply $Vm_{std}$ by $530/T_m$(°R) if meter not temp. compensated. Data Sheet 6002-4

1) USE 420°F, 380°F OF FIELD DATA SHEET DECLARED TO BE IN ERROR

PLANT
LOCATION 38
OPERATOR
DATE 5/12
RUN NO. 200-14
SAMPLE BOX NO.
METER BOX NO.
METER H
C FACTOR

METHOD 5 CONTROL CONSOLE READINGS

SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE 70
BAROMETRIC PRESSURE 29.40
ASSUMED MOISTURE, % 11
HEATER BOX SETTING
PROBE LENGTH, IN. 20"
NOZZLE DIAMETER, IN. 3/8
PROBE HEATER SETTING

CASCADE IMPACTOR

| Traverse Point Number | ~~Sampling~~ Time ~~(θ)Min.~~ | Static Pressure $(P_s)$, In. Hg. | Stack Temperature $(T_s)$°F | Velocity Head $(P_s)$ | Pressure Differential Across Orifice Meter $(\Delta H)$, In. $H_2O$ | Gas Sample Volume $(V_m)$ $ft^3$ | Gas Sample Temperature at Dry Gas Meter |  | Sample Box Temprtature °F | Temperature of Gas Leaving Condenser on Last Impinger °F |
|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  | Inlet $(T_{m\,in.})$ °F | Outlet $(T_{m\,out})$ °F |  |  |
|  | 1542 | 0.09 | no meas. | — | 2.0 | 965.7080 | 68 | 60 | — | 50 |
|  | 1552 | ↓ |  | — | 1.8 | 975.1 | 72 | 62 | — | 55 |
|  | 1602 | ↓ |  | — | 1.4 | 979.9 | 75 | 65 | — | 55 |
|  | 1612 | ↓ |  | — | 1.6 | 988.3 | 76 | 67 | — | 55 |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| TOTAL |  |  |  |  |  | 20.6 |  | AVG. 64 | AVG. |  |
| AVERAGE |  |  |  |  |  |  | 73 | AVG. 68 |  |  |

Test No. 200-14

## CASCADE IMPACTOR DATA SHEET

TEST RUN NO. 200-14 LOCATION 38 DATE 5-11-76

IMPACTOR NO. 1 CYCLONE NO. NONE OPERATOR RP + GC

SAMPLE POINT LOCATION EAST UPPER PORT, 20" INSIDE

SUBSTRATE COATING NONE FUEL #6 TEST LOAD 40 klb/hr

IMPACTOR ORIENTATION NOZZLE DOWN FLOW THRU IMPACTOR 0.69 CFM

FLUE STATIC PRESSURE 0.09 in$H_2O$,VELOCITY

NOZZLE DIA. 3/8 INCH IMPACTOR PRESSURE DROP — END TIME 1612

GAS METER END 986.3 CF START TIME 1542

GAS METER START 965.7 CF DURATION 30 MIN

GAS VOLUME 20.6 CF FLOW RATE 0.67 CFM

AMBIENT TEMPERATURE 80 °F PRESSURE 29.40 IN Hg. HUMIDITY %

FLUE GAS MOLECULAR WT. , TEMP. 428 °F, DENSITY g/cc,VISCOSITY POISE

| | Stage Number | | | | | | | Stage Blank |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | | |
| Foil + Sample, g | .7529 | .7513 | .7448 | .7456 | .7522 | .7572 | | .7668 |
| Unused Foil, g | .7529 | .7492 | .7406 | .7422 | .7589 | .7616 | | .7668 |
| Sample, g | 0 | .0021 | .0042 | .0034 | — | — | | 0 |
| Correction for Blank, g | 0 | 0 | 0 | 0 | 0 | 0 | | |
| Final Sample, g | 0 | .0021 | .0042 | .0034 | — | — | | |
| $D_{50}$ | 29.5 | 14.0 | 5.3 | 2.4 | 1.35 | 0.60 | | |

| FILTER NO. 2 | Sample #2 | Blank #3 |
|---|---|---|
| FILTER + SAMPLE,g | .1621 | .1361 |
| FILTER TARE, g | .1438 | .1361 |
| SAMPLE, g | .0183 | 0 |
| CORRECTION FOR BLANK, g | 0 | |
| FINAL SAMPLE, g | .0183 | |

FULL CONTAINER, g

EMPTY CONTAINER, g

CYCLONE CATCH, g NONE

PLANT 38
LOCATION 38
OPERATOR R.P.
DATE 5-14-76
RUN NO. 200-18
SAMPLE BOX NO.
METER BOX NO. EN-45-1
METER H 1.72
FACTOR @ .9

METHOD 5 CONTROL CONSOLE READINGS

AMBIENT TEMPERATURE 82
BAROMETRIC PRESSURE 30.06
ASSUMED MOISTURE, % 10
HEATER BOX SETTING
PROBE LENGTH, IN.
NOZZLE DIAMETER, IN. 1/4
PROBE HEATER SETTING
UPPER LOCATION

SCHEMATIC OF STACK CROSS SECTION

| Traverse Point Number | Sampling Time (e)Min. | Static Pressure $(P_s)$, In. Hg. | Stack Temperature $(T_s)$ °F | Velocity Head $(P_s)$ | Pressure Differential Across Orifice Meter (ΔH), In. $H_2O$ | Gas Sample Volume $(V_m)$ ft$^3$ | Gas Sample Temperature at Dry Gas Meter Inlet $(T_{min.})$ °F | Gas Sample Temperature at Dry Gas Meter Outlet $(T_{mout})$ °F | Sample Box Temprtature °F | Temperature of Gas Leaving Condenser on Last Impinger °F |
|---|---|---|---|---|---|---|---|---|---|---|
| 20" | 1600 | .25 | | | .48 | 988.8013 | 77 | 75 | | 60 |
| INSIDE STACK | 1610 | | | | .48 | 992.5000 | 82 | 77 | | 60 |
| | 1620 | | | | .48 | 996.4000 | 88 | 80 | | 60 |
| | 1630 | | | | .48 | 1000.2000 | 92 | 82 | | 60 |
| | 1640 | | | | .48 | 1004.1000 | 94 | 85 | | 60 |
| | 1645 | | 390 | | .48 | 1006.0064 | 94 | 85 | | 60 |
| | | | | | | | | | | |
| | | | | | | 17.2051 | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| TOTAL | | | | | | | | AVG. | AVG. | |
| AVERAGE | | | | | | | | AVG. | | |

Test No. 200 - 18

## CASCADE IMPACTOR DATA SHEET

TEST RUN NO. 200 - 18 LOCATION 38 DATE 5-14-76

IMPACTOR NO. 1 CYCLONE NO. NONE OPERATOR R P

SAMPLE POINT LOCATION EAST UPPER PORT, 20" INSIDE

SUBSTRATE COATING NONE FUEL # 6 TEST LOAD 38 klb/hr

IMPACTOR ORIENTATION NOZZLE DOWN FLOW THRU IMPACTOR ______ CFM

FLUE STATIC PRESSURE ______ $inH_2O$, VELOCITY ______

NOZZLE DIA. 1/4 INCH IMPACTOR PRESSURE DROP ______ END TIME 1645

GAS METER END 1006.0064 CF START TIME 1600

GAS METER START 988.8013 CF DURATION 45 MIN

GAS VOLUME 17.2051 CF FLOW RATE ______ CFM

AMBIENT TEMPERATURE ______ °F PRESSURE ______ IN Hg. HUMIDITY ______ %

FLUE GAS MOLECULAR WT. ______, TEMP. 395 °F, DENSITY ______ g/cc, VISCOSITY ______ POISE

|  | Stage Number |  |  |  |  |  |  | Stage Blank |
|---|---|---|---|---|---|---|---|---|
|  | 1 | 2 | 3 | 4 | 5 | 6 |  |  |
| Foil + Sample, g | .7647 | .7466 | .7519 | .7549 | .7503 | .7624 |  | .7668 |
| Unused Foil, g | .7592 | .7489 | .7509 | .7484 | .7504 | .7669 |  |  |
| Sample, g | .0055 | — | .0010 | .0065 | — | — |  | 0 |
| Correction for Blank, g | 0 | 0 | 0 | 0 | 0 | 0 |  |  |
| Final Sample, g |  |  |  |  |  |  |  |  |

| FILTER NO. | Sample | Blank |
|---|---|---|
| FILTER + SAMPLE, g | .1619 | .1320 |
| FILTER TARE, g | .1361 | 1320 |
| SAMPLE, g | .0251 | 0 |
| CORRECTION FOR BLANK, g | 0 |  |
| FINAL SAMPLE, g | .0251 |  |

FULL CONTAINER, g ______

EMPTY CONTAINER, g ______

CYCLONE CATCH, g NONE

PLANT 38
LOCATION 38
OPERATOR RP
DATE 5-20-76
RUN NO. 203-26A
SAMPLE BOX NO.
METER BOX NO. EN-45-1
METER H
C FACTOR @

METHOD 5 CONTROL CONSOLE READINGS

AMBIENT TEMPERATURE
BAROMETRIC PRESSURE
ASSUMED MOISTURE, % 10
HEATER BOX SETTING
PROBE LENGTH, IN.
NOZZLE DIAMETER, IN. 3/8
PROBE HEATER SETTING

SCHEMATIC OF STACK CROSS SECTION

| Traverse Point Number | Sampling Time (e)Min. | Static Pressure $(P_s)$, In. Hg. | Stack Temperature $(T_s)$ °F | Velocity Head $(P_s)$ | Pressure Differential Across Orifice Meter $(\Delta H)$, In. $H_2O$ | Gas Sample Volume $(V_m)$ $ft^3$ | Gas Sample Temperature at Dry Gas Meter Inlet $(T_{min.})$ °F | Gas Sample Temperature at Dry Gas Meter Outlet $(T_{mout})$ °F | Sample Box Temprtature °F | Temperature of Gas Leaving Condenser on Last Impinger °F |
|---|---|---|---|---|---|---|---|---|---|---|
| PN 20" | 1115 | | 425 | .35 | 1.0 | 7.0000 | | | | |
| | STOP 1116 | | — | — | | 7.5000 | VACUUM PUMP BAD. | | | |
| | RESTART 1150 | | 425 | .35 | 4.0 | 8.3000 | 70 | 64 | 320 | 55 |
| | 1200 | | 425 | .35 | 4.0 | 17.2000 | 82 | 67 | 320 | 60 |
| | 1210 | | 425 | .35 | 4.0 | 27.6000 | 90 | 71 | 320 | 60 |
| | 1220 | | 425 | .35 | 4.0 | 38.1000 | 94 | 75 | 320 | 60 |
| | 1230 | | 429 | .35 | 4.0 | 49.5000 | 86 | 76 | 310 | 60 |
| | 1240 | | 428 | .35 | 4.0 | 60.9000 | 88 | 73 | 320 | 60 |
| | 1248 | | 428 | .35 | 4.0 | 68.8000 | 90 | 75 | 320 | 60 |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| TOTAL | | | | | | | | | | |
| AVERAGE | | | | | | | | AVG.<br>AVG. | AVG. | |

## PARTICULATE CALCULATION SHEET

Test No 203-26A Date 5-20-76 Location 38 Test Crew

Box No. Sample Probe Position

Test Description

Dry Gas Meter Vol. (ft$^3$)

Final

Initial

Total

Impinger Water Vol (ml)

| | 1 | 2 | 3 | S. Gel | Total |
|---|---|---|---|---|---|
| Final | 230 | 67 | 2 | 668.85 | |
| Initial | 100 | 100 | 0 | 654.25 | |
| Δ Vol | 130 | -33 | 2 | 14.60 | 113.6 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Beaker No. | 7 | 5 | 6 | | | Filter No. 3 | Blank No. 4 |
| Date Weighed | | | | | | | |
| Tare Wt. 1 | 102.4673 | 100.4803 | 100.0144 | | | .6693 | .6704 |
| 2 | 102.4674 | 100.4805 | 100.0148 | | | .6694 | .6706 |
| 3 | | | | | | | |
| 4 | | | | | | | |
| 5 | | | | | | | |
| 6 | | | | | | | |
| Avg | 102.4674 | 100.4804 | 100.0146 | | | .6694 | .6705 |
| Bottle No. | | | | | | | |
| Content | Impinger (Water) | Probe (Acetone) | Probe (Water) | Cyclone (Acetone) | Flask (Dry) | | |
| Rinse (ml) | | | | | | | |
| Date Weighed or 250 Bake | | | | | | | |
| Final Wt. 250 1 | 102.5500 | 100.4963 | 100.0706 | | | .8276 | .6706 |
| 2 | 102.5503 | 100.4963 | 100.0708 | | | .8278 | .6705 |
| 3 | 102.5505 | 100.4964 | 100.0710 | | | .8279 | |
| 4 | | | | | | | |
| 5 | | | | | | | |
| 6 | | | | | | | |
| Avg | 102.5503 | 100.4963 | 100.0708 | | | .8278 | .6706 |
| Residue wt Final 250-Tare | .0829 | .0159 | .0562 | | | .1584 | 0 |
| Date Weighed or 650 Bake | | | | | | | |
| Final Wt. 650 1 | | | | | | | |
| 2 | | | | | | | |
| 3 | | | | | | | |
| 4 | | | | | | | |
| 5 | | | | | | | |
| 6 | | | | | | | |
| Avg | | | | | | | |
| Residue Wt Final 650-Tare | | | | | | | |

Comments:

Data Sheet 6002-3

## PARTICULATE EMISSION CALCULATIONS

Test No. 203-26A Date 5-20-76 Location 38 Engr.

Unit No. Fuel Sampling Train and Method

Pitot Factor, Fs 0.83 Barometric Pressure, $P_{bar}$ 29.72 in. Hg

Tot. Liquid Collected, $V_{1c}$ 113.6 ml Total Particulate, $M_n$ 313.4 m gm

Velocity Head, ΔP .35 iwg Stack Temp., Ts 886 °R Stack Area, As 7.47 $ft^2$

Sample Volume, Vm 61 $ft^3$ Stack Press., Psg 0.09 iwg Excess $O_2$, $XO_2$% 3.3 %

Orifice Press. Diff., H 4.0 iwg Stack Gas Sp. Gravity, Gs n.d.

Sample Time, θ 59 min Nozzle Dia., Dn 3/8 in. Meter Temp., $T_m$ °R

| | | | |
|---|---|---|---|
| *1. Sample Gas Volume | $Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$ | 61.15 | SCF |
| 2. Water Vapor | $Vw_{std} = 0.0474\ V_{1c}$ | 5.38 | SCF |
| 3. Moisture Content | Bwo = Eq. 2/(Eq. 1 + Eq. 2) | 0.0809 | N.D. |
| 4. Concentration | a. $C = 0.0154\ Mn/Vm_{std}$ | 0.0789 | grains/DSCF |
| | b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$ | $1.13 \times 10^{-5}$ | lb/DSCF |
| | c. $C = \text{Eq. 4b} \times 16.018 \times 10^{3}$ | $1.81 \times 10^{-1}$ | grams/DSCM |
| 5. Abs. Stack Press. | $Ps = P_{bar} \times 13.6 + Psg$ | 404.2 | in. w abs. |
| 6. Stack Gas Speed | $Vs = 174\ Fs\ \sqrt{\Delta P Ts}\sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$ | 2551 | ft/min |
| 7. Stack Gas Flow Rate @ 70°F | a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$ | 11,132 | WSCF/min |
| | b. Qsd = Eq. 7a x (1. - Eq. 3) | 10,231 | DSCF/min |
| 8. Material Flow | Ms = Eq. 7b x Eq. 4b x 60 | 6.936 | lb/hr |
| 9. $XO_2$ factor | $XO_2f = 2090/(20.9 - XO_2\%)$ | 118.8 | N.D. |
| 10. Emission | a. E = Eq. 4b x Fe x Eq. 9 | $1.22 \times 10^{-1}$ | lb/MMBtu |
| | b. E = Eq. 4c x Fm x Eq. 9 x 1000 | $5.26 \times 10^{1}$ | ng/joule |
| 11. % Isokinetic | $I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$ | 97.0 | % |

| | Oil | Gas | Coal |
|---|---|---|---|
| Fe SC Feet/$10^4$ Btu | 92.2 | 87.4 | 98.2 |
| Fm SC Meters/$10^4$ joules | 0.002475 | 0.002346 | 0.002636 |

*Multiply $Vm_{std}$ by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

PLANT 38
LOCATION 38
OPERATOR R.P.
DATE 5-20-76
RUN NO. 203-26-B
SAMPLE BOX NO.
METER BOX NO. EN-45-1
METER H
C FACTOR @

METHOD 5 CONTROL CONSOLE READINGS

SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE
BAROMETRIC PRESSURE
ASSUMED MOISTURE, % 10
HEATER BOX SETTING
PROBE LENGTH, IN. 72"
NOZZLE DIAMETER, IN. 3/8"
PROBE HEATER SETTING

| Traverse Point Number | Sampling Time (e) Min. | Static Pressure ($P_s$), In. Hg. | Stack Temperature ($T_s$) °F | Velocity Head ($P_s$) | Pressure Differential Across Orifice Meter ($\Delta H$), In. $H_2O$ | Gas Sample Volume ($V_m$) $ft^3$ | Gas Sample Temperature at Dry Gas Meter | | Sample Box Temprtature °F | Temperature of Gas Leaving Condenser on Last Impinger °F |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Inlet ($T_{min.}$) °F | Outlet ($T_{mout}$) °F | | |
| 1st 20" | 1600 | | 434 | .35 | 4.0 | 70.6056 | 81 | 78 | 320 | 60 |
| | 1610 | | 435 | .35 | 4.0 | 81.6000 | 98 | 80 | 320 | 60 |
| | 1620 | | 446 | .35 | 4.0 | 94.4000 | 105 | 84 | 320 | 60 |
| | 1630 | | 447 | .35 | 4.0 | 109.3000 | 106 | 86 | 320 | 60 |
| | 1640 | | 442 | .35 | 4.0 | 115.0000 | 104 | 86 | 320 | 60 |
| | 1650 | | 443 | .35 | 4.0 | 127.3000 | 108 | 87 | 250 | 60 |
| | 1655 | | | | | 131.6056 | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| TOTAL | 55 | | | | | 61.0000 | | AVG. | AVG. | |
| AVERAGE | | | | | | | | AVG. | | |

## PARTICULATE CALCULATION SHEET

Test Crew
Test No. 203-268 Date 5-20-76 Location 38
Box No. Sample Probe Position
Test Description

Dry Gas Meter Vol. ($ft^3$)
Final
Initial
Total

Impinger Water Vol (ml)

| | 1 | 2 | 3 | S. Gel | Total |
|---|---|---|---|---|---|
| Final | 197 | 105 | 3 | 619.52 | |
| Initial | 100 | 100 | 0 | 605.50 | |
| Δ Vol | 97 | 5 | 3 | 14.02 | 119.02 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Beaker No. | | 10 | 8 | 9 | | | Filter No. 4 | Blank No. 5 |
| Date Weighed | | | | | | | | |
| Tare Wt. | 1 | 103.1676 | 99.2092 | 98.8323 | | | .6706 | .5803 |
| | 2 | 103.1676 | 99.2094 | 98.8323 | | | .6705 | .5804 |
| | 3 | | | | | | | |
| | 4 | | | | | | | |
| | 5 | | | | | | | |
| | 6 | | | | | | | |
| | Avg | 103.1676 | 99.2093 | 98.8323 | | | .6706 | .5804 |
| Bottle No. | | | | | | | | |
| Content | | Impinger (Water) | Probe (Acetone) | Probe (Water) | Cyclone (Acetone) | Flask (Dry) | | |
| Rinse (ml) | | | | | | | | |
| Date Weighed or 250 Bake | | | | | | | | |
| Final Wt. 250 | 1 | 103.3000 | 99.2230 | 98.8760 | | | .8501 | .5802 |
| | 2 | 103.3000 | 99.2231 | 98.8763 | | | .8503 | .5804 |
| | 3 | 103.3002 | 99.2233 | 98.8764 | | | .8506 | |
| | 4 | | | | | | | |
| | 5 | | | | | | | |
| | 6 | | | | | | | |
| | Avg | 103.3001 | 99.2232 | 98.8762 | | | .8503 | 5803 |
| Residue wt Final 250-Tare | | .1325 | .0139 | .0439 | | | .1797 | 0 |
| Date Weighed or 650 Bake | | | | | | | | |
| Final Wt. 650 | 1 | | | | | | | |
| | 2 | | | | | | | |
| | 3 | | | | | | | |
| | 4 | | | | | | | |
| | 5 | | | | | | | |
| | 6 | | | | | | | |
| | Avg | | | | | | | |
| Residue Wt Final 650-Tare | | | | | | | | |

Comments:

Data Sheet 6002-3

## PARTICULATE EMISSION CALCULATIONS

Test No. 203-26B Date 5-20-76 Location 38 Engr. ____

Unit No. ____ Fuel ____ Sampling Train and Method ____

Pitot Factor, Fs .83 Barometric Pressure, $P_{bar}$ 29.72 in. Hg

Tot. Liquid Collected, $V_{lc}$ 119.02 ml Total Particulate, $M_n$ 370.0 m gm

Velocity Head, ΔP .35 iwg Stack Temp., Ts 901 °R Stack Area, As 7.47 $ft^2$

Sample Volume, Vm 61.0 $ft^3$ Stack Press., Psg .09 iwg Excess $O_2$, $XO_2$% 3.1 %

Orifice Press. Diff., H 4.0 iwg Stack Gas Sp. Gravity, Gs 1 n.d.

Sample Time, θ 55 min Nozzle Dia., Dn 3/8 in. Meter Temp., $T_m$ ____ °R

*1. Sample Gas Volume $Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$ 61.15 SCF

2. Water Vapor $Vw_{std} = 0.0474\ V_{lc}$ 5.64 SCF

3. Moisture Content $Bwo = Eq.\ 2/(Eq.\ 1 + Eq.\ 2)$ .084 N.D.

4. Concentration a. $C = 0.0154\ Mn/Vm_{std}$ .093 grains/DSCF

b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$ $1.33 \times 10^{-5}$ lb/DSCF

c. $C = Eq.\ 4b \times 16.018 \times 10^3$ $2.14 \times 10^{-1}$ grams/DSCM

5. Abs. Stack Press. $Ps = P_{bar} \times 13.6 + Psg$ 404.3 in. w abs.

6. Stack Gas Speed $Vs = 174\ Ps \sqrt{\Delta PTs} \sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$ 2573 ft/min

7. Stack Gas Flow Rate @ 70°F a. $Qsw = Eq.\ 6 \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$ 11,232 WSCF/min

b. $Qsd = Eq.\ 7a \times (1. - Eq.\ 3)$ 10,288 DSCF/min

8. Material Flow $Ms = Eq.\ 7b \times Eq.\ 4b \times 60$ 8.21 lb/hr

9. $XO_2$ factor $XO_2f = 2090/(20.9 - XO_2\%)$ 117.4 N.D.

10. Emission a. $E = Eq.\ 4b \times Fe \times Eq.\ 9$ $1.44 \times 10^{-1}$ lb/MMBtu

b. $E = Eq.\ 4c \times Fm \times Eq.\ 9 \times 1000$ 62.2 ng/joule

11. % Isokinetic $I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$ 105.3 %

| | Oil | Gas | Coal |
|---|---|---|---|
| Fe SC Feet/$10^4$ Btu | 92.2 | 87.4 | 98.2 |
| Fm SC Meters/$10^4$ joules | 0.002475 | 0.002346 | 0.002636 |

*Multiply $Vm_{std}$ by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

PLANT 38
LOCATION 38
OPERATOR RP
DATE 5-21-76
RUN NO. 203-27
SAMPLE BOX NO.
METER BOX NO. EN 45-1
METER H
C FACTOR @

METHOD 5 CONTROL CONSOLE READINGS

AMBIENT TEMPERATURE
BAROMETRIC PRESSURE 29.6
ASSUMED MOISTURE, % 10
HEATER BOX SETTING
PROBE LENGTH, IN.
NOZZLE DIAMETER, IN. 1/4
PROBE HEATER SETTING

Impinger ok

SCHEMATIC OF STACK CROSS SECTION

| Traverse Point Number | Sampling Time (e)Min. | Static Pressure ($P_s$), In. Hg. | Stack Temperature ($T_s$) °F | Velocity Head ($P_s$) | Pressure Differential Across Orifice Meter ($\Delta H$), In. $H_2O$ | Gas Sample Volume ($V_m$) $ft^3$ | Gas Sample Temperature at Dry Gas Meter | | Sample Box Temprtature °F | Temperature of Gas Leaving Condenser on Last Impinger °F |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Inlet ($T_{min.}$) °F | Outlet ($T_{mout}$) °F | | |
| STACK, | 1116 | | 426 | .35 | .83 | 147.8084 | 91 | 90 | — | 60 |
| EAST Lower PORT | 1126 | | 427 | .35 | .83 | 152.7000 | 96 | 90 | — | 60 |
| | 1136 | | 428 | .35 | .83 | 157.9000 | 96 | 90 | — | 65 |
| | 1146 | | 427 | .35 | .83 | 162.9000 | 91 | 87 | | 65 |
| | 1156 | | 427 | .35 | .83 | 168.1000 | 89 | 84 | | 65 |
| | 1201 | | 427 | .35 | .83 | 170.8032 | 92 | 84 | | 65 |
| | | | | | | | | | | |
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| | | | | | | | | | | |
| | | | | | | | | | | |
| TOTAL | | | | | | | | | | |
| AVERAGE | 45 min | | 427 | .35 | .83 | 22.9948 | | AVG.<br>AVG. | AVG. | |

Test No. 203-27

CASCADE IMPACTOR DATA SHEET

TEST RUN NO. 203-27 LOCATION 38 DATE MAY 21, 1976

IMPACTOR NO. ______ CYCLONE NO. NONE OPERATOR RP, ST

SAMPLE POINT LOCATION STACK EAST LOWER PORT

SUBSTRATE COATING GREASE FUEL ______ TEST LOAD ______ klb/hr

IMPACTOR ORIENTATION NOZZLE DOWN FLOW THRU IMPACTOR ______ CFM

FLUE STATIC PRESSURE ______ $inH_2O$, VELOCITY ______

NOZZLE DIA. 1/4 INCH IMPACTOR PRESSURE DROP ______ END TIME ______

GAS METER END ______ CF START TIME ______

GAS METER START ______ CF DURATION 45 MIN

GAS VOLUME 22.9948 CF FLOW RATE ______ CFM

AMBIENT TEMPERATURE ______ °F PRESSURE ______ IN Hg. HUMIDITY ______ %

FLUE GAS MOLECULAR WT. ______, TEMP. ______ °F, DENSITY ______ g/cc, VISCOSITY ______ POISE

| | Stage Number | | | | | | | Stage Blank |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | | |
| Foil + Sample, g | .7618 | .7490 | .7595 | .7482 | .7596 | .7553 | | .7517 |
| Unused Foil, g | .7609 | .7466 | .7563 | .7461 | .7590 | .7548 | | .7518 |
| Sample, g | .0009 | .0024 | .0032 | .0021 | .0006 | .0005 | | 0 |
| Correction for Blank, g | 0 | 0 | 0 | 0 | 0 | 0 | | |
| Final Sample, g | .0009 | .0024 | .0032 | .0021 | .0006 | .0005 | | |

| FILTER NO. | 4<br>Sample | 5<br>Blank |
|---|---|---|
| FILTER + SAMPLE, g | .1616 | .1343 |
| FILTER TARE, g | .1323 | .1343 |
| SAMPLE, g | .0293 | 0 |
| CORRECTION FOR BLANK, g | 0 | |
| FINAL SAMPLE, g | .0293 | |

FULL CONTAINER, g ______

EMPTY CONTAINER, g ______

CYCLONE CATCH, g NONE

PLANT 38
LOCATION 38
OPERATOR RP
DATE 5-24-76
RUN NO. 200-24
SAMPLE BOX NO.
METER BOX NO. EN 45-1
METER H
C FACTOR @ .89

METHOD 5 CONTROL CONSOLE READINGS

SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE
BAROMETRIC PRESSURE
ASSUMED MOISTURE, %
HEATER BOX SETTING
PROBE LENGTH, IN.
NOZZLE DIAMETER, IN. 3/8
PROBE HEATER SETTING

| Traverse Point Number | Sampling Time (e) Min. | Static Pressure ($P_s$), In. Hg. | Stack Temperature ($T_s$) °F | Velocity Head ($P_s$) | Pressure Differential Across Orifice Meter ($\Delta H$), In. $H_2O$ | Gas Sample Volume ($V_m$) ft$^3$ | Gas Sample Temperature at Dry Gas Meter | | Sample Box Temprtature °F | Temperature of Gas Leaving Condenser on Last Impinger °F |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Inlet ($T_{min.}$) °F | Outlet ($T_{mout}$) °F | | |
| STACK EAST | 1410 | | 426 | .48 | 5.4 | 182.2010 | 82 | 74 | 320 | 60 |
| LOWER PORT | 1425 | | 425 | .48 | 4.8 | 200.4000 | 93 | 76 | 320 | 75 |
| STOP | 1426 | | — | .45 | — | 201.4017 | — | — | — | — |
| RESTART | 1456 | | 425 | .45 | 4.8 | 201.9034 | 95 | 74 | 320 | 60 |
| | 1511 | | 425 | .45 | 4.6 | 219.6000 | 90 | 76 | 320 | 70 |
| | 1526 | | 425 | .45 | 4.5 | 238.0000 | 90 | 76 | 320 | 68 |
| | 1532 | | | | | 243.7027 | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| TOTAL | 52 | | | | | 61.0000 | | AVG. | AVG. | |
| AVERAGE | | | | | | | | AVG. | | |

## PARTICULATE CALCULATION SHEET

Test No. 205-24 Date 5-24-76 Location 38 Test Crew
Box No. Sample Probe Position
Test Description

Dry Gas Meter Vol. (ft$^3$)
Final
Initial
Total 61.0000

Impinger Water Vol (ml)

| | 1 | 2 | 3 | S. Gel | Total |
|---|---|---|---|---|---|
| Final | 167 | 115 | 3 | 656.62 | |
| Initial | 100 | 100 | 0 | 630.42 | |
| Δ Vol | 67 | 15 | 3 | 26.20 | 111.20 |

| | | | | | | | Filter No. 5 | Blank No. 6 |
|---|---|---|---|---|---|---|---|---|
| Beaker No. | | 13 | 11 | 12 | | | | |
| Date Weighed | | | | | | | | |
| Tare Wt. | 1 | 99.4123 | 81.6736 | 101.3034 | | | .5803 | .5851 |
| | 2 | 99.4124 | 81.6736 | 101.3035 | | | .5804 | .5851 |
| | 3 | | | | | | | |
| | 4 | | | | | | | |
| | 5 | | | | | | | |
| | 6 | | | | | | | |
| | Avg | 99.4124 | 81.6736 | 101.3035 | | | .5804 | .5851 |
| Bottle No. | | | | | | | | |
| Content | | Impinger (Water) | Probe (Acetone) | Probe (Water) | Cyclone (Acetone) | Flask (Dry) | | |
| Rinse (ml) | | | | | | | | |
| Date Weighed or 250 Bake | | | | | | | | |
| Final Wt. 250 | 1 | 99.5923 | 81.6831 | 101.3686 | | | .7282 | .5850 |
| | 2 | 99.5925 | 81.6831 | 101.3689 | | | .7284 | .5851 |
| | 3 | 99.5926 | | 101.3700 | | | .7286 | |
| | 4 | | | | | | | |
| | 5 | | | | | | | |
| | 6 | | | | | | | |
| | Avg | 99.5925 | 81.6831 | 101.3688 | | | .7284 | .5851 |
| Residue wt Final 250-Tare | | .1801 | .0095 | .0633 | | | .1480 | 0 |
| Date Weighed or 650 Bake | | | | | | | | |
| Final Wt. 650 | 1 | | | | | | | |
| | 2 | | | | | | | |
| | 3 | | | | | | | |
| | 4 | | | | | | | |
| | 5 | | | | | | | |
| | 6 | | | | | | | |
| | Avg | | | | | | | |
| Residue Wt Final 650-Tare | | | | | | | | |

Comments:

Data Sheet 6002-3

# PARTICULATE EMISSION CALCULATIONS

Test No. 200-24 Date 5-24-76 Location ______ Engr. ______

Unit No. ______ Fuel ______ Sampling Train and Method ______

Pitot Factor, Fs .83 Barometric Pressure, $P_{bar}$ 29.75 in. Hg

Tot. Liquid Collected, $V_{1c}$ 111.20 ml Total Particulate, $M_n$ 400.9 m gm

Velocity Head, ΔP .45 iwg Stack Temp., Ts 885 °R Stack Area, As 7.07 $ft^2$

Sample Volume, Vm 61.0 $ft^3$ Stack Press., Psg .09 iwg Excess $O_2$, $XO_2$% 2.9 %

Orifice Press. Diff., H 4.8 iwg Stack Gas Sp. Gravity, Gs ______ n.d.

Sample Time, θ 52 min Nozzle Dia., Dn 3/8 in. Meter Temp., $T_m$ ______ °R

*1. Sample Gas Volume $Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$ 61.33 SCF

2. Water Vapor $Vw_{std} = 0.0474\ V_{1c}$ 5.27 SCF

3. Moisture Content Bwo = Eq. 2/(Eq. 1 + Eq. 2) 0.079 N.D.

4. Concentration a. $C = 0.0154\ Mn/Vm_{std}$ 0.101 grains/DSCF

b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$ $1.44 \times 10^{-5}$ lb/DSCF

c. $C = \text{Eq. 4b} \times 16.018 \times 10^3$ $2.31 \times 10^{-1}$ grams/DSCM

5. Abs. Stack Press. $Ps = P_{bar} \times 13.6 + Psg$ 404.7 in. w abs.

6. Stack Gas Speed $Vs = 174\ Fs \sqrt{\Delta P Ts} \sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$ 2890 ft/min

7. Stack Gas Flow Rate @ 70°F a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$ 12,857 WSCF/min

b. Qsd = Eq. 7a x (1. - Eq. 3) 11,841 DSCF/min

8. Material Flow Ms = Eq. 7b x Eq. 4b x 60 10.23 lb/hr

9. $XO_2$ factor $XO_2f = 2090/(20.9 - XO_2\%)$ 116.1 N.D.

10. Emission a. E = Eq. 4b x Fe x Eq. 9 0.154 lb/MMBtu

b. E = Eq. 4c x Fm x Eq. 9 x 1000 66.38 ng/joule

11. % Isokinetic $I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$ 97.0 %

| | Oil | Gas | Coal |
|---|---|---|---|
| Fe SC Feet/$10^4$ Btu | 92.2 | 87.4 | 98.2 |
| Fm SC Meters/$10^4$ joules | 0.002475 | 0.002346 | 0.002636 |

*Multiply $Vm_{std}$ by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

PLANT 38
LOCATION 38
OPERATOR R.P.
DATE 5-24-76
RUN NO. 200-24
SAMPLE BOX NO.
METER BOX NO. EN 45-1
METER H
C FACTOR @

METHOD 5 CONTROL CONSOLE READINGS

SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE
BAROMETRIC PRESSURE
ASSUMED MOISTURE, % 10
HEATER BOX SETTING
PROBE LENGTH, IN.
NOZZLE DIAMETER, IN. 1/4"
PROBE HEATER SETTING
IMPACTOR

| Traverse Point Number | Sampling Time (e)Min. | Static Pressure $(P_s)$, In. Hg. | Stack Temperature $(T_s)$ °F | Velocity Head $(P_s)$ | Pressure Differential Across Orifice Meter $(\Delta H)$, In. $H_2O$ | Gas Sample Volume $(V_m)$ $ft^3$ | Gas Sample Temperature at Dry Gas Meter | | Sample Box Temprtature °F | Temperature of Gas Leaving Condenser on Last Impinger °F |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Inlet $(T_{min.})$ °F | Outlet $(T_{mout})$ °F | | |
| EAST PORT | 1647 | | 435 | .45 | .68 | 261.0000 | 78 | 75 | | 55 |
| LOWER | 1657 | | 442 | .45 | .68 | 265.5000 | 79 | 74 | | 55 |
| | 1707 | | 442 | .45 | .68 | 270.0000 | 79 | 74 | | 55 |
| | 1717 | | 442 | .45 | .68 | 274.1000 | 78 | 74 | | 55 |
| | 1727 | | 442 | .45 | .68 | 278.9000 | 79 | 75 | | 60 |
| | 1732 | | 442 | | | 281.3058 | 82 | 76 | | 60 |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| TOTAL | 45 | | | | | 20.3058 | | | | |
| AVERAGE | | | | | | | | AVG. | AVG. | |

353

Test No. 200-24

## CASCADE IMPACTOR DATA SHEET

TEST RUN NO. 200-24 LOCATION 38 DATE 5-24-76

IMPACTOR NO. ______ CYCLONE NO. NONE OPERATOR R. P. Sr.

SAMPLE POINT LOCATION LOWER EAST PORT (STACK)

SUBSTRATE COATING NONE FUEL ______ TEST LOAD ______ klb/hr

IMPACTOR ORIENTATION NOZZLE DOWN FLOW THRU IMPACTOR ______ CFM

FLUE STATIC PRESSURE ______ inH$_2$O, VELOCITY ______

NOZZLE DIA. 1/4 INCH IMPACTOR PRESSURE DROP ______ END TIME ______

GAS METER END ______ CF START TIME ______

GAS METER START ______ CF DURATION 45 MIN

GAS VOLUME 20.3058 CF FLOW RATE ______ CFM

AMBIENT TEMPERATURE ______ °F PRESSURE ______ IN Hg. HUMIDITY ______ %

FLUE GAS MOLECULAR WT. ______, TEMP. ______ °F, DENSITY ______ g/cc, VISCOSITY ______ POISE

| | Stage Number | | | | | | | Stage Blank |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | | |
| Foil + Sample, g | .7451 | .7432 | .7492 | .7482 | .7410 | .7493 | | .7516 |
| Unused Foil, g | .7447 | .7427 | .7485 | .7467 | .7401 | .7487 | | .7516 |
| Sample, g | .0004 | .0005 | .0007 | .0015 | .0009 | .0006 | | 0 |
| Correction for Blank, g | 0 | 0 | 0 | 0 | 0 | 0 | | |
| Final Sample, g | .0004 | .0005 | .0007 | .0015 | .0009 | .0006 | | |

| FILTER NO. | 5<br>Sample | 6<br>Blank |
|---|---|---|
| FILTER + SAMPLE, g | .1591 | .1375 |
| FILTER TARE, g | .1343 | .1375 |
| SAMPLE, g | .0248 | 0 |
| CORRECTION FOR BLANK, g | 0 | |
| FINAL SAMPLE, g | .0248 | |

FULL CONTAINER, g ______

EMPTY CONTAINER, g ______

CYCLONE CATCH, g NONE

PLANT 38
LOCATION 38
OPERATOR
DATE 5-25-76
RUN NO. 201-12
SAMPLE BOX NO.
METER BOX NO.
METER H
C FACTOR @

METHOD 5 CONTROL CONSOLE READINGS

SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE
BAROMETRIC PRESSURE
ASSUMED MOISTURE, %
HEATER BOX SETTING
PROBE LENGTH, IN.
NOZZLE DIAMETER, IN. 3/8
PROBE HEATER SETTING

| Traverse Point Number | Sampling Time (e)Min. | Static Pressure ($P_s$), In. Hg. | Stack Temperature ($T_s$)°F | Velocity Head ($P_s$) | Pressure Differential Across Orifice Meter ($\Delta H$), In. $H_2O$ | Gas Sample Volume ($V_m$) ft$^3$ | Gas Sample Temperature at Dry Gas Meter | | Sample Box Temprtature °F | Temperature of Gas Leaving Condenser on Last Impinger °F |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Inlet ($T_{min.}$) °F | Outlet ($T_{mout}$) °F | | |
| LOWER EAST STACK | 1100 | | 426 | .31 | 3.5 | 324.6025 | 90 | 82 | 320 | 50 |
| | 1110 | | 426 | .31 | 3.5 | 334.2000 | 110 | 87 | 320 | 50 |
| | 1120 | | 426 | .31 | 3.5 | 345.2000 | 112 | 90 | 320 | 70 |
| | 1130 | | 427 | .31 | 3.5 | 354.6000 | 112 | 90 | 320 | 70 |
| | 1140 | | 428 | .31 | 3.5 | 364.9000 | 117 | 92 | 320 | 70 |
| | 1150 | | 428 | .31 | 3.5 | 375.2000 | 117 | 92 | 320 | 70 |
| | 1159 | | 428 | .31 | 3.5 | 385.6025 | 114 | 92 | 320 | 70 |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| TOTAL | 59 | | | | | 61.0000 | | AVG. | AVG. | |
| AVERAGE | | | | | | | | AVG. | | |

# PARTICULATE CALCULATION SHEET

Test Crew

Test No. 201-12 Date 5-25-76 Location

Box No. Sample Probe Position

Test Description

Dry Gas Meter Vol. ($ft^3$)

Final

Initial

Total

Impinger Water Vol (ml)

| | 1 | 2 | 3 | S. Gel | Total |
|---|---|---|---|---|---|
| Final | 172 | 130 | 3 | 689.82 | |
| Initial | 100 | 100 | 0 | 669.00 | |
| Δ Vol | 72 | 30 | 3 | 20.82 | 125.82 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Beaker No. | 17 | 14 | 15 | | | Filter No. 6 | Blank No. 7 |
| Date Weighed | | | | | | | |
| Tare Wt. 1 | 85.9074 | 84.6185 | 77.4904 | | | .5851 | .5849 |
| 2 | 85.9078 | 84.6184 | 77.4904 | | | .5851 | .5849 |
| 3 | | | | | | | |
| 4 | | | | | | | |
| 5 | | | | | | | |
| 6 | | | | | | | |
| Avg | 85.9076 | 84.6185 | 77.4904 | | | .5851 | .5849 |
| Bottle No. | | | | | | | |
| Content | Impinger (Water) | Probe (Acetone) | Probe (Water) | Cyclone (Acetone) | Flask (Dry) | | |
| Rinse (ml) | | | | | | | |
| Date Weighed or 250 Bake | | | | | | | |
| Final Wt. 250 1 | 85.9681 | 84.6451 | 77.5356 | | | .7620 | .5849 |
| 2 | 85.9683 | 84.6451 | 77.5357 | | | .7621 | .5849 |
| 3 | 85.9684 | | | | | .7624 | |
| 4 | | | | | | | |
| 5 | | | | | | | |
| 6 | | | | | | | |
| Avg | 85.9683 | 84.6451 | 77.5357 | | | .7622 | .5849 |
| Residue wt Final 250-Tare | | .0266 | .0453 | | | .1771 | 0 |
| Date Weighed or 650 Bake | | | | | | | |
| Final Wt. 650 1 | | | | | | | |
| 2 | | | | | | | |
| 3 | | | | | | | |
| 4 | | | | | | | |
| 5 | | | | | | | |
| 6 | | | | | | | |
| Avg | | | | | | | |
| Residue Wt Final 650-Tare | | | | | | | |

Comments:

Data Sheet 6002-3

## PARTICULATE EMISSION CALCULATIONS

Test No. 201-12 Date 5-25-76 Location ______ Engr. ______

Unit No. ______ Fuel ______ Sampling Train and Method ______

Pitot Factor, Fs .83 Barometric Pressure, $P_{bar}$ 29.93 in. Hg

Tot. Liquid Collected, $V_{1c}$ 125.82 ml Total Particulate, $M_n$ 309.7 m gm

Velocity Head, ΔP .31 iwg Stack Temp., Ts 887 °R Stack Area, As 7.47 $ft^2$

Sample Volume, Vm 61.0 $ft^3$ Stack Press., Psg 0.09 iwg Excess $O_2$, $XO_2$% 1.55 %

Orifice Press. Diff., H 3.5 iwg Stack Gas Sp. Gravity, Gs 1 n.d.

Sample Time, θ 59 min Nozzle Dia., Dn 3/8 in. Meter Temp., $T_m$ ______ °R

*1. Sample Gas Volume $Vm_{std} = 0.0334\, Vm(P_{bar} + H/13.6)$ 61.50 SCF

2. Water Vapor $Vw_{std} = 0.0474\, V_{1c}$ 5.96 SCF

3. Moisture Content Bwo = Eq. 2/(Eq. 1 + Eq. 2) 0.088 N.D.

4. Concentration a. $C = 0.0154\, Mn/Vm_{std}$ 0.0776 grains/DSCF

b. $C = 2.205 \times 10^{-6}\, Mn/Vm_{std}$ $1.11 \times 10^{-5}$ lb/DSCF

c. C = Eq. 4b x $16.018 \times 10^3$ .1779 grams/DSCM

5. Abs. Stack Press. $Ps = P_{bar} \times 13.6 + Psg$ 407.1 in. w abs.

6. Stack Gas Speed $Vs = 174\, Fs \sqrt{\Delta PTs} \sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$ 2394 ft/min

7. Stack Gas Flow Rate @ 70°F a. $Qsw = \text{Eq. } 6 \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$ 10,690 WSCF/min

b. Qsd = Eq. 7a x (1. - Eq. 3) 9750 DSCF/min

8. Material Flow Ms = Eq. 7b x Eq. 4b x 60 6.49 lb/hr

9. $XO_2$ factor $XO_2f = 2090/(20.9 - XO_2\%)$ 108.0 N.D.

10. Emission a. E = Eq. 4b x Fe x Eq. 9 0.110 lb/MMBtu

b. E = Eq. 4c x Fm x Eq. 9 x 1000 47.6 ng/joule

11. % Isokinetic $I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$ 104.2 %

| | Oil | Gas | Coal |
|---|---|---|---|
| Fe SC Feet/$10^4$ Btu | 92.2 | 87.4 | 98.2 |
| Fm SC Meters/$10^4$ joules | 0.002475 | 0.002346 | 0.002636 |

*Multiply $Vm_{std}$ by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

PLANT 38
LOCATION 38
OPERATOR
DATE 5-25-76
RUN NO. 202-4
SAMPLE BOX NO.
METER BOX NO. EN 45-1
METER H
C FACTOR @

METHOD 5 CONTROL CONSOLE READINGS

SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE
BAROMETRIC PRESSURE
ASSUMED MOISTURE, %
HEATER BOX SETTING
PROBE LENGTH, IN.
NOZZLE DIAMETER, IN. 3/8
PROBE HEATER SETTING

| Traverse Point Number | Sampling Time (e)Min. | Static Pressure $(P_s)$, In. Hg. | Stack Temperature $(T_s)$ °F | Velocity Head $(P_s)$ | Pressure Differential Across Orifice Meter (ΔH), In. $H_2O$ | Gas Sample Volume $(V_m)$ ft$^3$ | Gas Sample Temperature at Dry Gas Meter | | Sample Box Temprtature °F | Temperature of Gas Leaving Condenser on Last Impinger °F |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Inlet $(T_{min.})$ °F | Outlet $(T_{mout})$ °F | | |
| LOWER EAST | 1515 | | 550 | .34 | 3.3 | 414.2005 | 68 | 67 | 320 | 50 |
| STACK IN 20" | 1525 | | 550 | 34 | 3.3 | 423.0000 | 74 | 67 | 320 | 50 |
| | 1535 | | 550 | .34 | 3.3 | 433.9000 | 75 | 67 | 320 | 50 |
| | 1545 | | 550 | .34 | 3.3 | 444.4000 | 77 | 67 | 320 | 50 |
| | 1555 | | 550 | .34 | 3.3 | 453.5000 | 77 | 67 | 320 | 50 |
| | 1605 | | 550 | .34 | 3.3 | 463.4000 | 78 | 67 | 320 | 50 |
| | 1618 | | 550 | .34 | 3.3 | 475.2005 | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| TOTAL | | | | | | 61.0 | | AVG. | AVG. | |
| AVERAGE | | | | | | | | AVG. | | |

## PARTICULATE CALCULATION SHEET

Test No. 202-4 Date 5-25-76 Location ____ Test Crew ____

Box No. ____ Sample Probe Position ____

Test Description ____

Dry Gas Meter Vol. ($ft^3$)

Final ____

Initial ____

Total ____

Impinger Water Vol (ml)

| | 1 | 2 | 3 | S. Gel | Total |
|---|---|---|---|---|---|
| Final | 204 | 117 | 2 | 629.30 | |
| Initial | 100 | 100 | 0 | 614.62 | |
| Δ Vol | 104 | 17 | 2 | 14.68 | 137.68 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Beaker No. | 20 | 18 | 19 | | | Filter No. 7 | Blank No. 8 |
| Date Weighed | | | | | | | |
| Tare Wt. 1 | 102.0406 | 103.1827 | 86.5893 | | | .5849 | .5770 |
| 2 | 102 0408 | 103.1833 | 86.5894 | | | .5849 | .5772 |
| 3 | | | | | | | |
| 4 | | | | | | | |
| 5 | | | | | | | |
| 6 | | | | | | | |
| Avg | 102.0407 | 103.1825 | 86.5894 | | | 5849 | .5771 |
| Bottle No. | | | | | | | |
| Content | Impinger (Water) | Probe (Acetone) | Probe (Water) | Cyclone (Acetone) | Flask (Dry) | | |
| Rinse (ml) | | | | | | | |
| Date Weighed or 250 Bake | | | | | | | |
| Final Wt. 250 1 | 102.1437 | 103.2023 | 86.6395 | | | .7464 | .5771 |
| 2 | 102.1440 | 103.2025 | 86.6396 | | | .7464 | .5771 |
| 3 | 102.1441 | 103.2024 | | | | .7466 | |
| 4 | | | | | | | |
| 5 | | | | | | | |
| 6 | | | | | | | |
| Avg | 102.1439 | 103.2024 | 86.6396 | | | .7465 | .5771 |
| Residue wt Final 250-Tare | .1032 | .0199 | .0502 | | | .1616 | 0 |
| Date Weighed or 650 Bake | | | | | | | |
| Final Wt. 650 1 | | | | | | | |
| 2 | | | | | | | |
| 3 | | | | | | | |
| 4 | | | | | | | |
| 5 | | | | | | | |
| 6 | | | | | | | |
| Avg | | | | | | | |
| Residue Wt Final 650-Tare | | | | | | | |

Comments:

Data Sheet 6002-3

# PARTICULATE EMISSION CALCULATIONS

Test No. 202-4 Date 5-25-76 Location 38 Engr. ________

Unit No. ________ Fuel ________ Sampling Train and Method ________

Pitot Factor, Fs .83 Barometric Pressure, $P_{bar}$ 29.93 in. Hg

Tot. Liquid Collected, $V_{1c}$ 137.68 ml Total Particulate, $M_n$ 334.9 m gm

Velocity Head, ΔP .34 iwg Stack Temp., Ts 1010 °R Stack Area, As 7.47 $ft^2$

Sample Volume, Vm 61.0 $ft^3$ Stack Press., Psg 0.09 iwg Excess $O_2$, $XO_2$% 2.6 %

Orifice Press. Diff., H 3.3 iwg Stack Gas Sp. Gravity, Gs 1 n.d.

Sample Time, θ 63 min Nozzle Dia., Dn 3/8 in. Meter Temp., $T_m$ ________ °R

| | | | |
|---|---|---|---|
| *1. Sample Gas Volume | $Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$ | 61.47 | SCF |
| 2. Water Vapor | $Vw_{std} = 0.0474\ V_{1c}$ | 6.53 | SCF |
| 3. Moisture Content | Bwo = Eq. 2/(Eq. 1 + Eq. 2) | 0.096 | N.D. |
| 4. Concentration | a. $C = 0.0154\ Mn/Vm_{std}$ | 0.084 | grains/DSCF |
| | b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$ | $1.20 \times 10^{-5}$ | lb/DSCF |
| | c. $C = \text{Eq. 4b} \times 16.018 \times 10^3$ | $1.924 \times 10^{-1}$ | grams/DSCM |
| 5. Abs. Stack Press. | $Ps = P_{bar} \times 13.6 + Psg$ | 407.1 | in. w abs. |
| 6. Stack Gas Speed | $Vs = 174\ Fs \sqrt{\Delta P Ts} \sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$ | 2676 | ft/min |
| 7. Stack Gas Flow Rate @ 70°F | a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$ | 10,440 | WSCF/min |
| | b. Qsd = Eq. 7a x (1. - Eq. 3) | 9,483 | DSCF/min |
| 8. Material Flow | Ms = Eq. 7b x Eq. 4b x 60 | 6.83 | lb/hr |
| 9. $XO_2$ factor | $XO_2f = 2090/(20.9 - XO_2\%)$ | 114.2 | N.D. |
| 10. Emission | a. E = Eq. 4b x Fe x Eq. 9 | .126 | lb/MMBtu |
| | b. E = Eq. 4c x Fm x Eq. 9 x 1000 | 54.38 | ng/joule |
| 11. % Isokinetic | $I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$ | 100.2 | % |

| | Oil | Gas | Coal |
|---|---|---|---|
| Fe SC Feet/$10^4$ Btu | 92.2 | 87.4 | 98.2 |
| Fm SC Meters/$10^4$ joules | 0.002475 | 0.002346 | 0.002636 |

*Multiply $Vm_{std}$ by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

PLANT 38
LOCATION 38
OPERATOR
DATE 5/26/76
RUN NO. 201-13
SAMPLE BOX NO.
METER BOX NO. EN-45-1
METER H
C FACTOR @

METHOD 5 CONTROL CONSOLE READINGS

AMBIENT TEMPERATURE
BAROMETRIC PRESSURE
ASSUMED MOISTURE, %
HEATER BOX SETTING
PROBE LENGTH, IN.
NOZZLE DIAMETER, IN. 1/4
PROBE HEATER SETTING
IMPACTOR

SCHEMATIC OF STACK CROSS SECTION

| Traverse Point Number | Sampling Time (e)Min. | Static Pressure $(P_s)$, In. Hg. | Stack Temperature $(T_s)$ °F | Velocity Head $(P_s)$ | Pressure Differential Across Orifice Meter $(\Delta H)$, In. $H_2O$ | Gas Sample Volume $(V_m)$ ft$^3$ | Gas Sample Temperature at Dry Gas Meter | | Sample Box Temprtature °F | Temperature of Gas Leaving Condenser on Last Impinger °F |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Inlet $(T_{m\,in.})$ °F | Outlet $(T_{m\,out})$ °F | | |
| LOWER EAST | 1114 | | 423 | .32 | .74 | 480.2024 | 67 | 64 | | 50 |
| STACK IN 20" | 1124 | | 422 | .32 | .74 | 485.2000 | 73 | 68 | | 50 |
| | 1134 | | 421 | .32 | .74 | 490.2000 | 76 | 71 | | 50 |
| | 1144 | | 421 | .32 | .74 | 494.8000 | 78 | 73 | | 50 |
| | 1154 | | 424 | .32 | .74 | 499.6000 | 76 | 73 | | 50 |
| | 1159 | | 424 | .32 | .74 | 502.3065 | 74 | 72 | | 50 |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| TOTAL | | | | | | | | AVG. | AVG. | |
| AVERAGE | | | | | | 22.1041 | | AVG. | | |

Test No. 38

## CASCADE IMPACTOR DATA SHEET

TEST RUN NO. 201-13 LOCATION 38 DATE MAY 26, 1976

IMPACTOR NO. ______ CYCLONE NO. NONE OPERATOR R. P. Sr.

SAMPLE POINT LOCATION STACK LOWER EAST PORT

SUBSTRATE COATING NONE FUEL ______ TEST LOAD ______ klb/hr

IMPACTOR ORIENTATION NOZZLE DOWN FLOW THRU IMPACTOR ______ CFM

FLUE STATIC PRESSURE ______ $inH_2O$, VELOCITY ______

NOZZLE DIA. 1/4 INCH IMPACTOR PRESSURE DROP ______ END TIME ______

GAS METER END ______ CF START TIME ______

GAS METER START ______ CF DURATION 45 MIN.

GAS VOLUME 22.1041 CF FLOW RATE ______ CFM

AMBIENT TEMPERATURE ______ °F PRESSURE ______ IN Hg. HUMIDITY ______ %

FLUE GAS MOLECULAR WT. ______, TEMP. ______ °F, DENSITY ______ g/cc, VISCOSITY ______ POISE

| | Stage Number | | | | | | | Stage Blank |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | | |
| Foil + Sample, g | .7511 | .7652 | .7637 | .7466 | .7480 | .7523 | | .7595 |
| Unused Foil, g | .7476 | .7594 | .7583 | .7441 | .7470 | .7516 | | .7595 |
| Sample, g | .0035 | .0058 | .0054 | .0025 | .0010 | .0007 | | 0 |
| Correction for Blank, g | 0 | 0 | 0 | 0 | 0 | 0 | | |
| Final Sample, g | .0035 | .0058 | .0054 | .0025 | .0010 | .0007 | | |

| FILTER NO. | 6<br>Sample | 7<br>Blank |
|---|---|---|
| FILTER + SAMPLE, g | .1621 | .1341 |
| FILTER TARE, g | .1375 | .1342 |
| SAMPLE, g | .0246 | 0 |
| CORRECTION FOR BLANK, g | 0 | |
| FINAL SAMPLE, g | .0246 | |

FULL CONTAINER, g ______

EMPTY CONTAINER, g ______

CYCLONE CATCH, g NONE

PLANT 38
LOCATION 38
OPERATOR
DATE 5-26-76
RUN NO. 202-5
SAMPLE BOX NO.
METER BOX NO. EN-45-1
METER H
C FACTOR @

METHOD 5 CONTROL CONSOLE READINGS

SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE
BAROMETRIC PRESSURE
ASSUMED MOISTURE, %
HEATER BOX SETTING
PROBE LENGTH, IN.
NOZZLE DIAMETER, IN. 1/4
PROBE HEATER SETTING

IMPACTOR

| Traverse Point Number | Sampling Time (e)Min. | Static Pressure ($P_s$), In. Hg. | Stack Temperature ($T_s$) °F | Velocity Head ($P_s$) | Pressure Differential Across Orifice Meter ($\Delta H$), In. $H_2O$ | Gas Sample Volume ($V_m$) $ft^3$ | Gas Sample Temperature at Dry Gas Meter Inlet ($T_{min.}$) °F | Gas Sample Temperature at Dry Gas Meter Outlet ($T_{mout}$) °F | Sample Box Temprtature °F | Temperature of Gas Leaving Condenser on Last Impinger °F |
|---|---|---|---|---|---|---|---|---|---|---|
| EAST LOWER | 1600 | | 530 | .30 | .6 | 724.7019 | 85 | 82 | | 50 |
| STACK IN 20" | 1610 | | 538 | .30 | .6 | 729.3000 | 80 | 80 | | 50 |
| | 1620 | | 542 | .30 | .6 | 733.3000 | 81 | 79 | | 55 |
| | 1630 | | 542 | .30 | .6 | 737.5000 | 80 | 78 | | 55 |
| | 1640 | | 546 | .30 | .6 | 741.7000 | 80 | 77 | | 55 |
| | 1645 | | 547 | .30 | .6 | 744.0000 | 80 | 78 | | 55 |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| TOTAL | 45 MIN | | | | | | | AVG. | AVG. | |
| AVERAGE | | | | | | 19.2981 | | AVG. | | |

Test No. 202-5

CASCADE IMPACTOR DATA SHEET

TEST RUN NO. 202-5 LOCATION 38 DATE 5-26-76

IMPACTOR NO. 1 CYCLONE NO. NONE OPERATOR R.P. Sr.

SAMPLE POINT LOCATION LOWER PORT STACK EAST

SUBSTRATE COATING NONE FUEL ____ TEST LOAD ____ klb/hr

IMPACTOR ORIENTATION NOZZLE DOWN FLOW THRU IMPACTOR ____ CFM

FLUE STATIC PRESSURE ____ $inH_2O$, VELOCITY ____

NOZZLE DIA. 1/4 INCH IMPACTOR PRESSURE DROP ____ END TIME ____

GAS METER END ____ CF START TIME ____

GAS METER START ____ CF DURATION 45 MIN.

GAS VOLUME 19.2981 CF FLOW RATE ____ CFM

AMBIENT TEMPERATURE ____ °F PRESSURE ____ IN Hg. HUMIDITY ____ %

FLUE GAS MOLECULAR WT. ____, TEMP. ____ °F, DENSITY ____ g/cc, VISCOSITY ____ POISE

| | Stage Number | | | | | | | Stage Blank |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | | |
| Foil + Sample, g | .7417 | .7543 | .7408 | .7583 | .7453 | .7384 | | .7595 |
| Unused Foil, g | .7404 | .7516 | .7397 | .7571 | .7448 | .7380 | | .7595 |
| Sample, g | .0013 | .0027 | .0011 | .0012 | .0005 | .0004 | | 0 |
| Correction for Blank, g | 0 | 0 | 0 | 0 | 0 | 0 | | |
| Final Sample, g | .0013 | .0027 | .0011 | .0012 | .0005 | .0004 | | |

| FILTER NO. | 7<br>Sample | 8<br>Blank |
|---|---|---|
| FILTER + SAMPLE, g | .1607 | .1350 |
| FILTER TARE, g | .1342 | 1350 |
| SAMPLE, g | .0265 | 0 |
| CORRECTION FOR BLANK, g | 0 | |
| FINAL SAMPLE, g | .0265 | |

FULL CONTAINER, g ____

EMPTY CONTAINER, g ____

CYCLONE CATCH, g NONE

PLANT 38
LOCATION 38
OPERATOR
DATE 5-27-76
RUN NO. 201-15
SAMPLE BOX NO.
METER BOX NO. EN 45-1
METER H
C FACTOR @

METHOD 5 CONTROL CONSOLE READINGS

AMBIENT TEMPERATURE
BAROMETRIC PRESSURE
ASSUMED MOISTURE, %
HEATER BOX SETTING
PROBE LENGTH, IN.
NOZZLE DIAMETER, IN. 3/8
PROBE HEATER SETTING

SCHEMATIC OF STACK CROSS SECTION

| Traverse Point Number | Sampling Time (e)Min. | Static Pressure $(P_s)$, In. Hg. | Stack Temperature $(T_s)$ °F | Velocity Head $(P_s)$ | Pressure Differential Across Orifice Meter $(\Delta H)$, In. $H_2O$ | Gas Sample Volume $(V_m)$ ft$^3$ | Gas Sample Temperature at Dry Gas Meter | | Sample Box Temprtature °F | Temperature of Gas Leaving Condenser on Last Impinger °F |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Inlet $(T_{min.})$ °F | Outlet $(T_{mout})$ °F | | |
| LOWER EAST | 1010 | | 417 | .31 | 3.6 | 825.2049 | 85 | 80 | 320 | 57 |
| STACK IN 20" | 1020 | | 422 | .34 | 3.9 | 835.6000 | 94 | 83 | 320 | 55 |
| | 1030 | | 422 | .34 | 3.9 | 846.5000 | 97 | 85 | 320 | 55 |
| | 1040 | | 422 | .34 | 3.9 | 857.5000 | 104 | 89 | 320 | 55 |
| | 1050 | | 426 | .34 | 3.9 | 869.2000 | 102 | 91 | 320 | 60 |
| | 1100 | | 428 | .34 | 3.9 | 880.0000 | 98 | 90 | 320 | 60 |
| | 1107 | | 428 | .34 | 3.9 | 886.2049 | 97 | 90 | 320 | 60 |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| TOTAL | 57 | | | | | 61.0000 | | AVG. | AVG. | |
| AVERAGE | | | | | | | | AVG. | | |

## PARTICULATE CALCULATION SHEET

Test Crew

Test No. 201-15 Date 5-27-76 Location

Box No. Sample Probe Position

Test Description

---

Dry Gas Meter Vol. (ft$^3$)

Final

Initial

Total

Impinger Water Vol (ml)

|  | 1 | 2 | 3 | S. Gel | Total |
|---|---|---|---|---|---|
| Final | 198 | 120 | 2 | 689.85 |  |
| Initial | 100 | 100 | 0 | 671.80 |  |
| Δ Vol | 98 | 20 | 2 | 18.05 | 138.05 |

|  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|
| Beaker No. |  | 23 | 21 | 22 |  |  | Filter No. 8 | Blank No. 9 |
| Date Weighed |  |  |  |  |  |  |  |  |
| Tare Wt. | 1 | 101.6364 | 84.6563 | 102.3461 |  |  | .5770 | .5642 |
|  | 2 | 101.6365 | 84.6555 | 102.3461 |  |  | .5772 | .5642 |
|  | 3 |  |  |  |  |  |  | .5641 |
|  | 4 |  |  |  |  |  |  |  |
|  | 5 |  |  |  |  |  |  |  |
|  | 6 |  |  |  |  |  |  |  |
|  | Avg | 101.6365 | 84.6559 | 102.3461 |  |  | .5771 | .5642 |
| Bottle No. |  |  |  |  |  |  |  |  |
| Content |  | Impinger (Water) | Probe (Acetone) | Probe (Water) | Cyclone (Acetone) | Flask (Dry) |  |  |
| Rinse (ml) |  |  |  |  |  |  |  |  |
| Date Weighed or 250 Bake |  |  |  |  |  |  |  |  |
| Final Wt. 250 | 1 | 101.6690 | 84.6896 | 102.3868 |  |  | .7554 | .5641 |
|  | 2 | 101.6690 | 84.6897 | 102.3869 |  |  | .7554 | .5642 |
|  | 3 | 101.6692 |  | 102.3868 |  |  | .7556 | .5644 |
|  | 4 |  |  |  |  |  |  |  |
|  | 5 |  |  |  |  |  |  |  |
|  | 6 |  |  |  |  |  |  |  |
|  | Avg | 101.6691 | 84.6897 | 102.3868 |  |  | .7555 | .5642 |
| Residue wt Final 250-Tare |  | .0326 | .0338 | .0407 |  |  | .1784 | 0 |
| Date Weighed or 650 Bake |  |  |  |  |  |  |  |  |
| Final Wt. 650 | 1 |  |  |  |  |  |  |  |
|  | 2 |  |  |  |  |  |  |  |
|  | 3 |  |  |  |  |  |  |  |
|  | 4 |  |  |  |  |  |  |  |
|  | 5 |  |  |  |  |  |  |  |
|  | 6 |  |  |  |  |  |  |  |
|  | Avg |  |  |  |  |  |  |  |
| Residue Wt Final 650-Tare |  |  |  |  |  |  |  |  |

Comments:

Data Sheet 6002-3

## PARTICULATE EMISSION CALCULATIONS

Test No. 201-15 Date 5-27-76 Location ________ Engr. ________

Unit No. ________ Fuel ________ Sampling Train and Method ________

Pitot Factor, Fs 0.83 Barometric Pressure, $P_{bar}$ 30.16 in. Hg

Tot. Liquid Collected, $V_{1c}$ 138.05 ml Total Particulate, $M_n$ 285.5 m gm

Velocity Head, ΔP .34 iwg Stack Temp., Ts 888 °R Stack Area, As 7.47 $ft^2$

Sample Volume, Vm 61.0 $ft^3$ Stack Press., Psg 0.09 iwg Excess $O_2$, $XO_2$% 1.6 %

Orifice Press. Diff., H 3.9 iwg Stack Gas Sp. Gravity, Gs 1 n.d.

Sample Time, θ 57 min Nozzle Dia., Dn 3/8 in. Meter Temp., $T_m$ ________ °R

| | | | |
|---|---|---|---|
| *1. Sample Gas Volume | $Vm_{std} = 0.0334\ Vm(P_{bar} + H/13.6)$ | 62.03 | SCF |
| 2. Water Vapor | $Vw_{std} = 0.0474\ V_{1c}$ | 6.54 | SCF |
| 3. Moisture Content | Bwo = Eq. 2/(Eq. 1 + Eq. 2) | 0.095 | N.D. |
| 4. Concentration | a. $C = 0.0154\ Mn/Vm_{std}$ | 0.0708 | grains/DSCF |
| | b. $C = 2.205 \times 10^{-6}\ Mn/Vm_{std}$ | $1.015 \times 10^{-5}$ | lb/DSCF |
| | c. $C = \text{Eq. 4b} \times 16.018 \times 10^3$ | 0.163 | grams/DSCM |
| 5. Abs. Stack Press. | $Ps = P_{bar} \times 13.6 + Psg$ | 410.3 | in. w abs. |
| 6. Stack Gas Speed | $Vs = 174\ Fs\ \sqrt{\Delta P Ts}\ \sqrt{\frac{407}{Ps} \times \frac{1.00}{Gs}}$ | 2499 | ft/min |
| 7. Stack Gas Flow Rate @ 70°F | a. $Qsw = \text{Eq. 6} \times As \times \frac{530}{Ts} \times \frac{Ps}{407}$ | 11,231 | WSCF/min |
| | b. Qsd = Eq. 7a x (1. - Eq. 3) | 10,164 | DSCF/min |
| 8. Material Flow | Ms = Eq. 7b x Eq. 4b x 60 | 6.190 | lb/hr |
| 9. $XO_2$ factor | $XO_2f = 2090/(20.9 - XO_2\%)$ | 108.3 | N.D. |
| 10. Emission | a. E = Eq. 4b x Fe x Eq. 9 | 0.101 | lb/MMBtu |
| | b. E = Eq. 4c x Fm x Eq. 9 x 1000 | 43.7 | ng/joule |
| 11. % Isokinetic | $I = \frac{14077 \times Ts(Vm_{std} + Vw_{std})}{\theta \times Vs \times Ps \times Dn^2}$ | 104.3 | % |

| | Oil | Gas | Coal |
|---|---|---|---|
| Fe SC Feet/$10^4$ Btu | 92.2 | 87.4 | 98.2 |
| Fm SC Meters/$10^4$ joules | 0.002475 | 0.002346 | 0.002636 |

*Multiply $Vm_{std}$ by $530/T_m$(°R) if meter not temp. compensated.

Data Sheet 6002-4

PLANT 38
LOCATION 38
OPERATOR
DATE 5-27-76
RUN NO. 203-28
SAMPLE BOX NO.
METER BOX NO. EN-45-1
METER H
C FACTOR @

METHOD 5 CONTROL CONSOLE READINGS

AMBIENT TEMPERATURE
BAROMETRIC PRESSURE
ASSUMED MOISTURE, %
HEATER BOX SETTING
PROBE LENGTH, IN.
NOZZLE DIAMETER, IN. 1/4
PROBE HEATER SETTING

SCHEMATIC OF STACK CROSS SECTION

| Traverse Point Number | Sampling Time (e)Min. | Static Pressure ($P_s$), In. Hg. | Stack Temperature ($T_s$) °F | Velocity Head ($P_s$) | Pressure Differential Across Orifice Meter (ΔH), In. $H_2O$ | Gas Sample Volume ($V_m$) $ft^3$ | Gas Sample Temperature at Dry Gas Meter |  | Sample Box Temprtature °F | Temperature of Gas Leaving Condenser on Last Impinger °F |
|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  | Inlet ($T_{min.}$) °F | Outlet ($T_{mout}$) °F |  |  |
| LOWER EAST | 1400 |  | 450 | .35 | .78 | 918.7000 | 85 | 87 |  | 65 |
| STACK IN 20" | 1410 |  | 450 | .35 | .78 | 923.3000 | 86 | 86 |  | 60 |
|  | 1420 |  | 450 | .35 | .78 | 928.3000 | 86 | 84 |  | 60 |
|  | 1430 |  | 450 | .35 | .78 | 933.2000 | 86 | 83 |  | 60 |
|  | 1440 |  | 449 | .35 | .78 | 938.3000 | 87 | 83 |  | 60 |
|  | 1445 |  | 449 | .35 | .78 | 940.6068 |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
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|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| TOTAL | 45 |  |  |  |  | 21.9068 |  | AVG. | AVG. |  |
| AVERAGE |  |  |  |  |  |  |  | AVG. |  |  |

Test No. 203-28

## CASCADE IMPACTOR DATA SHEET

TEST RUN NO. 203-28 LOCATION 38 DATE 5-27-76

IMPACTOR NO. 1 CYCLONE NO. NONE OPERATOR R. P. Sr.

SAMPLE POINT LOCATION STACK LOWER EAST PORT

SUBSTRATE COATING NONE FUEL ____ TEST LOAD ____ klb/hr

IMPACTOR ORIENTATION ____ FLOW THRU IMPACTOR ____ CFM

FLUE STATIC PRESSURE ____ $inH_2O$, VELOCITY ____

NOZZLE DIA. 1/16 INCH IMPACTOR PRESSURE DROP ____ END TIME ____

GAS METER END ____ CF START TIME ____

GAS METER START ____ CF DURATION 45 MIN.

GAS VOLUME 21.9068 CF FLOW RATE ____ CFM

AMBIENT TEMPERATURE ____ °F PRESSURE ____ IN Hg. HUMIDITY ____ %

FLUE GAS MOLECULAR WT. ____, TEMP. ____ °F, DENSITY ____ g/cc, VISCOSITY ____ POISE

| | Stage Number | | | | | | | Stage Blank |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | | |
| Foil + Sample, g | .7364 | .7405 | .7602 | .7521 | .7472 | .7358 | | .7595 |
| Unused Foil, g | .7349 | .7384 | .7578 | .7503 | .7467 | .7355 | | .7595 |
| Sample, g | .0015 | .0021 | .0024 | .0018 | .0005 | .0003 | | 0 |
| Correction for Blank, g | 0 | 0 | 0 | 0 | 0 | 0 | | |
| Final Sample, g | .0015 | .0021 | .0024 | .0018 | .0005 | .0003 | | |

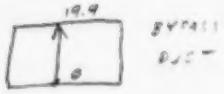
| FILTER NO. | 8<br>Sample | 9<br>Blank |
|---|---|---|
| FILTER + SAMPLE, g | .1602 | 1334 |
| FILTER TARE, g | .1350 | .1335 |
| SAMPLE, g | .0252 | 0 |
| CORRECTION FOR BLANK, g | 0 | |
| FINAL SAMPLE, g | .0252 | |

FULL CONTAINER, g ____

EMPTY CONTAINER, g ____

CYCLONE CATCH, g NONE

60-20



## VELOCITY TRAVERSE

**Project:**

**Date:** 5/26/76

**Location:** 38

**Unit:**

**Test:** 202-5

**Fuel:**

**Test Description:**

**Personnel:**

**Barometric Press. (in. Hg):**

**Absolute Static Press. in Stack (in. Hg):** ($P_s$)

**Pitot Tube Coefficient:** ($C_p$)

Stack Cross Section

$$V_s = 85.48\ C_p \left[\frac{T_s \Delta P}{P_s M_s}\right]^{1/2}$$

NEAREST DOWNSTREAM DISTURBANCE: WINDBOX 1.2 FURNACE ~2

INLET TEMP · 76° FD SETTING 61 ID 84

| Time | Traverse Port | Point Depth | Velocity Head (in. $H_2O$) | Gas Temp. (°F) | Gas Temp. (°R) | Molecular Wt. | Velocity (ft/sec) | $O_2$ Conc. (% Dry) |
|---|---|---|---|---|---|---|---|---|
| | | | ΔP | | $T_s$ | $M_s$ | $V_s$ | |
| | | 0 | 1.1 1.2 | | | | | |
| | | 1 | | | | | | |
| | | 2 | 1.3 1.3 | | | | | |
| | | 4 | 1.2 1.2 | | | | | |
| | | 6 | 0.9 .9 | | | | | |
| | | 8 | .85 .82 | | | | | |
| | | 10 | .55 .82 | | | | | |
| | | 12 | .82 .72 | | | | | |
| | | 14 | .71 .68 | | | | | |
| | | 16 | .76 .77 | | | | | |
| | | 18 | .80 | | | | | |
| | | 18.5 | .7 | | | | | |
| | | 19.5 | .48 | | | | | |
| | | | | | | | | |
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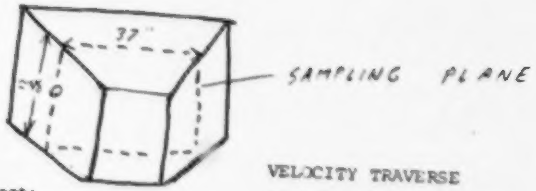
6002-13

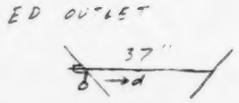


## VELOCITY TRAVERSE

Project: 
Date: 5/27/76
Location: 38
Unit: 
Test: 201-15
Fuel:

Test Description:

Personnel:



Stack Cross Section

Barometric Press. (in. Hg): 
Absolute Static Press. in Stack (in. Hg): ($P_s$)
Pitot Tube Coefficient: ($C_p$)

$$V_S = 85.48\ C_p \left[\frac{T_S \Delta P}{P_S M_S}\right]^{1/2}$$

201-15 87°    203-28 91°

| Time | Traverse Point Port | Traverse Point Depth | Velocity Head (in. $H_2O$) | Gas Temp. (°F) | Gas Temp. (°R) | Molecular Wt. | Velocity (ft/sec) | $O_2$ Conc. (% Dry) |
|---|---|---|---|---|---|---|---|---|
| | | | $\Delta P$ | | $T_S$ | $M_S$ | $V_S$ | |
| | | 0 | .05 | .025 | | | | |
| | | 2 | .05 | | | | | |
| | | 4 | .05 | .03 | | | | |
| | | 6 | .05 | | | | | |
| | | 8 | .05 | .04 | | | | |
| | | 10 | .05 | | | | | |
| | | 12 | .05 | .025 | | | | |
| | | 14 | .05 | | | | | |
| | | 16 | .05 | .03 | | | | |
| | | 18 | .05 | .02-.03 | | | | |
| | | 20 | .05 | .03 | | | | |
| | | 22 | .05 | | | | | |
| | | 24 | .05 | .025 | | | | |
| | | 26 | .05 | | | | | |
| | | 28 | .05 | .015-.025 | | | | |
| | | 30 | .05 | | | | | |
| | | 32 | .05 | .02-.03 | .015-.03 | | | |
| | | 34 | .05 | | | | | |
| | | 36 | .05 | | | | | |

6002-13

# VELOCITY TRAVERSE

Project:
Test Description:
Date:
Location: 38
Unit:
Test: 203-28
Personnel:
Fuel:
Barometric Press. (in. Hg):
Absolute Static Press. in Stack (in. Hg): ($P_s$)
Pitot Tube Coefficient: ($C_p$)

$$V_S = 85.48\, C_p \left[\frac{T_S \Delta P}{P_S M_S}\right]^{1/2}$$

$T_{16} = 100\,°F$

Stack Cross Section

SCR DUCTS

| Time | Traverse Point Port | Traverse Point Depth | Velocity Head (in. $H_2O$) | | Gas Temp. (°F) | Gas Temp. (°R) | Molecular Wt. | Velocity (ft/sec) | $O_2$ Conc. (% Dry) |
|---|---|---|---|---|---|---|---|---|---|
| | | | #17 ΔP | #18 | | $T_S$ | $M_S$ | $V_S$ | |
| | | .4 | .19 .18 | .14 .16 | | | | | |
| | | 1.5 | .21 21 | .17 .18 | | | | | |
| | | 3.0 | .21 .21 | .19 .19 | | | | | |
| | | 7.0 | .21 .20 | .18 .18 | | | | | |
| | | 8.5 | .21 .20 | .16 .16 | | | | | |
| | | 9.1 | .15 | .14 .14 | | | | | |
| | | | | | | | | | |
| | | Avg ΔP | .195 | .166 | | | | | |
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## VELOCITY TRAVERSE

Project:

Date: 6/3/76

Location: 38

Unit:

Test: 204-2

Fuel:

Test Description:

Personnel:

Barometric Press. (in. Hg):

Absolute Static Press. in Stack (in. Hg): ($P_s$)

Pitot Tube Coefficient: ($C_p$)

$$V_S = 85.48\ C_P \left[\frac{T_S \Delta P}{P_S M_S}\right]^{1/2}$$

Stack Cross Section

| Time | Traverse Point Port | Depth | Velocity Head (in. $H_2O$) | Gas Temp. (°F) | Gas Temp. (°R) | Molecular Wt. | Velocity (ft/sec) | $O_2$ Conc. (% Dry) |
|---|---|---|---|---|---|---|---|---|
| | | | =.19 ΔP =.17 | | $T_S$ | $M_S$ | $V_S$ | |
| | | .4 | .24 .18 | | | | | |
| | | 1.5 | .25 .20 | | | | | |
| | | 3.0 | .26 .20 | | | | | |
| | | 7 | .23 .20 | | | | | |
| | | 8.5 | .21 .20 | | | | | |
| | | 9.1 | .17 .13 | | | | | |
| | | | | | | | | |
| | | AVG. | .227 .27 | | | | | |
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## VELOCITY TRAVERSE

**Project:**

**Date:** 6/3/76

**Location:** 38

**Unit:**

**Test:** 204-3

**Fuel:**

**Test Description:**

**Personnel:**

**Barometric Press. (in. Hg):**

**Absolute Static Press. in Stack (in. Hg):** ($P_s$)

**Pitot Tube Coefficient:** ($C_p$)

$$V_s = 85.48\, C_p \left[\frac{T_s \Delta P}{P_s M_s}\right]^{1/2}$$

**Stack Cross Section**

| Time | Traverse Point Port | Depth | Velocity Head (in. $H_2O$) | | Gas Temp. (°F) | Gas Temp. (°R) | Molecular Wt. | Velocity (ft/sec) | $O_2$ Conc. (% Dry) |
|---|---|---|---|---|---|---|---|---|---|
| | | | #19 ΔP | #17 | | $T_S$ | $M_S$ | $V_S$ | |
| | | .4 | .17 | .13 | | | | | |
| | | 1.5 | .18 | .15 | | | | | |
| | | 3.0 | .19 | .17 | | | | | |
| | | 7 | .17 | .16 | | | | | |
| | | 8.5 | .17 | .15 | | | | | |
| | | 9.1 | .15 | .09 | | | | | |
| | | | | | | | | | |
| | | AVG. | .172 | .142 | | | | | |
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6002-13

## VELOCITY TRAVERSE

Project:
Date: 6/3/76
Location:
Unit:
Test: 204-6
Fuel:

Test Description:

Personnel:

Barometric Press. (in. Hg):
Absolute Static Press. in Stack (in. Hg): $(P_s)$
Pitot Tube Coefficient: $(C_p)$

$$V_S = 85.48\ C_P \left[\frac{T_S \Delta P}{P_S M_S}\right]^{1/2}$$

Stack Cross Section

| Time | Traverse Point | | Velocity Head (in. $H_2O$) | | Gas Temp. (°F) | Gas Temp. (°R) | Molecular Wt. | Velocity (ft/sec) | $O_2$ Conc. (% Dry) |
|---|---|---|---|---|---|---|---|---|---|
| | Port | Depth | 1st | ΔP 2nd | | $T_S$ | $M_S$ | $V_S$ | |
| | | 1 | .61 | .45 | | | | | |
| | | 3 | .47 | .36 | | | | | |
| | | 5 | .39 | .32 | | | | | |
| | | 7 | .35 | .30 | | | | | |
| | | 9 | .34 | .27 | | | | | |
| | | 11 | .35 | .25 | | | | | |
| | | 13 | .31 | .23 | | | | | |
| | | 15 | .20 | .18 | | | | | |
| | | 17 | .26 | .27 | | | | | |
| | | 19 | .26 | .30 | | | | | |
| | | 21 | .26 | .33 | | | | | |
| | | 23 | .3 | .34 | | | | | |
| | | 25 | .28 | .35 | | | | | |
| | | 27 | .28 | .34 | | | | | |
| | | 29 | .23 | .33 | | | | | |
| | | 31 | .21 | .22 | | | | | |

6002-13

## VELOCITY TRAVERSE

Project:

Date: 6-4-76

Location: 38

Unit:

Test: 204-7

Fuel:

Test Description:

Personnel:

Barometric Press. (in. Hg):

Absolute Static Press. in Stack (in. Hg): ____ ($P_s$)

Pitot Tube Coefficient: ____ ($C_p$)

$$V_S = 85.48\ C_p \left[\frac{T_S \Delta P}{P_S M_S}\right]^{1/2}$$

Stack Cross Section

SCA

| Time | Traverse Point Port | Depth | Velocity Head (in. $H_2O$) | | Gas Temp. (°F) | Gas Temp. (°R) | Molecular Wt. | Velocity (ft/sec) | $O_2$ Conc. (% Dry) |
|---|---|---|---|---|---|---|---|---|---|
| | | | (18) $\Delta P$ | (17) | | $T_S$ | $M_S$ | $V_S$ | |
| | | .4 | .19 | .19 | | | | | |
| | | 1.5 | .23 | .21 | | | | | |
| | | 3.0 | .24 | .22 | | | | | |
| | | 7.0 | .21 | .21 | | | | | |
| | | 8.5 | .19 | .21 | | | | | |
| | | 9.4 | .17 | .16 | | | | | |
| | | | | | | | | | |
| | | AVG. | .205 | .20 | | | | | |
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6002-13

## VELOCITY TRAVERSE

Project:
Date: 6/4/76
Location: 38
Unit:
Test: 2016-8
Fuel:

Test Description:

Personnel:

Barometric Press. (in. Hg):
Absolute Static Press. in Stack (in. Hg): 5.2 ($P_s$)
Pitot Tube Coefficient: ($C_p$)

$$V_s = 85.48\ C_p \left[\frac{T_s \Delta P}{P_s M_s}\right]^{1/2}$$

Stack Cross Section

FD

| Time | Traverse Point Port | Depth | Velocity Head (in. $H_2O$) | Gas Temp. (°F) | Gas Temp. (°R) | Molecular Wt. | Velocity (ft/sec) | $O_2$ Conc. (% Dry) |
|---|---|---|---|---|---|---|---|---|
| | | | 1 ΔP 2 | | $T_s$ | $M_s$ | $V_s$ | |
| | | 1 | .87 .59 .70 | 84.5 | | | | |
| | | 3 | .80 .55-.65 | | | | | |
| | | 5 | .70 .50-.60 | | | | | |
| | | 7 | .61 .47-.52 | | | | | |
| | | 9 | .52 .4[illegible] .48 | | | | | |
| | | 11 | .48 .28 .47 | | | | | |
| | | 13 | .49 .3[illegible] .45 | | | | | |
| | | 15 | .46 .3[illegible] .28 | | | | | |
| | | 17 | .20 .37 .28 | | | | | |
| | | 19 | .40 .45 .38 | | | | | |
| | | 21 | .67 .50 .46 | | | | | |
| | | 23 | .56 .59 .48 | | | | | |
| | | 25 | .54 .70 .55 | | | | | |
| | | 27 | .54 .62 | | | | | |
| | | 29 | .62 .75 | | | | | |
| | | 31 | .67 .80 | | | | | |

6002-13

## VELOCITY TRAVERSE

Project: 
Date: 6/7/77
Location: 38
Unit: 
Test: 204-11
Fuel: 
Test Description: 
Personnel: 
Barometric Press. (in. Hg): 
Absolute Static Press. in Stack (in. Hg): ______ $(P_s)$
Pitot Tube Coefficient: ______ $(C_p)$

$$V_s = 85.48\, C_p \left[\frac{T_s \Delta P}{P_s M_s}\right]^{1/2}$$

Stack Cross Section

S-A

| Time | Traverse Point Port | Depth | Velocity Head (in. $H_2O$) | Gas Temp. (°F) | Gas Temp. (°R) | Molecular Wt. | Velocity (ft/sec) | $O_2$ Conc. (% Dry) |
|---|---|---|---|---|---|---|---|---|
| | | | #17ΔP #18 | | $T_S$ | $M_S$ | $V_S$ | |
| | | .4 | .14 .19 | | | | | |
| | | 1.5 | .22 .21 | | | | | |
| | | 3 | .25 .23 | | | | | |
| | | 7 | .2[illegible] .22 | | | | | |
| | | 8.5 | .1[illegible] .21 | | | | | |
| | | 9.1 | .15 .20 | | | | | |
| | | | | | | | | |
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6002-13

## VELOCITY TRAVERSE

Project: 
Date: 6/7/76
Location: 38
Unit: 
Test: 204-11
Fuel:

Test Description:

Personnel:

Barometric Press. (in. Hg): 
Absolute Static Press. in Stack (in. Hg): ______ ($P_s$)
Pitot Tube Coefficient: ______ ($C_p$)

$$V_s = 85.48\, C_p \left[\frac{T_s \Delta P}{P_s M_s}\right]^{1/2}$$

Stack Cross Section

F D

| Time | Traverse Point Port | Depth | Velocity Head (in. $H_2O$) ① ΔP | ② | Gas Temp. (°F) | Gas Temp. (°R) $T_s$ | Molecular Wt. $M_s$ | Velocity (ft/sec) $V_s$ | $O_2$ Conc. (% Dry) |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | .56 | .40 | | | | | |
| | | 5 | .37 | .33 | | | | | |
| | | 9 | .34 | .30 | | | | | |
| | | 13 | .32 | .25 | | | | | |
| | | 17 | .24 | .30 | | | | | |
| | | 21 | .30 | .34 | | | | | |
| | | 25 | .28 | .32 | | | | | |
| | | 29 | .32 | .35 | | | | | |
| 1" | from wall | 31" | .32 | .34 | | | | | |
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6002-13

## VELOCITY TRAVERSE

Project:
Test Description:
Date: 6/7/76
Location: 38
Unit:
Test: 204-13
Personnel:
Fuel:
Barometric Press. (in. Hg):
Absolute Static Press. in Stack (in. Hg): ($P_s$)
Pitot Tube Coefficient: ($C_p$)

$$V_s = 85.48\, C_p \left[\frac{T_s \Delta P}{P_s M_s}\right]^{1/2}$$

Stack Cross Section

SCA

| Time | Traverse Point Port | Traverse Point Depth | Velocity Head (in. $H_2O$) | Gas Temp. (°F) | Gas Temp. (°R) | Molecular Wt. | Velocity (ft/sec) | $O_2$ Conc. (% Dry) |
|---|---|---|---|---|---|---|---|---|
| | | | #17 ΔP #18 | | $T_s$ | $M_s$ | $V_s$ | |
| | | .4 | .07 .1 | | | | | |
| | | 1.5 | .1 .11 | | | | | |
| | | 3 | .1 .12 | | | | | |
| | | 7 | .09 .12 | | | | | |
| | | 8.5 | .1 .13 | | | | | |
| | | 9.1 | .08 .13 | | | | | |
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6002-13

## VELOCITY TRAVERSE

Project:
Date: 6/7/76
Location: 38
Unit:
Test: 204-14
Fuel:
Test Description:
Personnel:
Barometric Press. (in. Hg):
Absolute Static Press. in Stack (in. Hg): ($P_s$)
Pitot Tube Coefficient: ($C_p$)

$$V_s = 85.48\ C_p \left[\frac{T_s \Delta P}{P_s M_s}\right]^{1/2}$$

Stack Cross Section

FD

| Time | Traverse Point Port | Depth | Velocity Head (in. $H_2O$) ① ΔP | ② | Gas Temp. (°F) | Gas Temp. (°R) | Molecular Wt. | Velocity (ft/sec) | $O_2$ Conc. (% Dry) |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | $T_S$ | $M_S$ | $V_S$ | |
| | | 1 | .52 | .36 | | | | | |
| | | 5 | .39 | .31 | | | | | |
| | | 9 | .31 | .28 | | | | | |
| | | 13 | .28 | .23 | | | | | |
| | | 17 | .23 | .29 | | | | | |
| | | 21 | .27 | .30 | | | | | |
| | | 25 | .28 | .33 | | | | | |
| | | 29 | .21 | .32 | | | | | |
| 1" FROM WALL | | 31 | .30 | .33 | | | | | |
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6002-13

# VELOCITY TRAVERSE

Project: 
Date: 6/7/76
Location: 38
Unit: 
Test: 204-14
Fuel: 
Test Description: 
Personnel: 
Barometric Press. (in. Hg): 
Absolute Static Press. in Stack (in. Hg): ($P_s$)
Pitot Tube Coefficient: ($C_p$)

$$V_s = 85.48\, C_p \left[\frac{T_s \Delta P}{P_s M_s}\right]^{1/2}$$

Stack Cross Section

SCA

| Time | Traverse Point Port | Depth | Velocity Head (in. $H_2O$) | | Gas Temp. (°F) | Gas Temp. (°R) | Molecular Wt. | Velocity (ft/sec) | $O_2$ Conc. (% Dry) |
|---|---|---|---|---|---|---|---|---|---|
| | | | #17 ΔP | #18 | | $T_s$ | $M_s$ | $V_s$ | |
| | | .4 | .06 | .08 | | | | | |
| | | 1.5 | .07 | .09 | | | | | |
| | | 3 | .07 | .10 | | | | | |
| | | 7 | .07 | .09 | | | | | |
| | | 8.5 | .08 | .10 | | | | | |
| | | 9.1 | .05 | .09 | | | | | |
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6002-13

## VELOCITY TRAVERSE

Project:
Date: 6/7/76
Location:
Unit:
Test: 204-15
Fuel:

Test Description:

Personnel:

Barometric Press. (in. Hg):
Absolute Static Press. in Stack (in. Hg): ____ $(P_s)$
Pitot Tube Coefficient: ____ $(C_p)$

$$V_S = 85.48\, C_p \left[\frac{T_S \Delta P}{P_S M_S}\right]^{1/2}$$

Stack Cross Section

| Time | Traverse Port | Point Depth | Velocity Head (in. $H_2O$) | | ~~Gas Temp. (°F)~~ | Gas Temp. (°R) | Molecular Wt. | Velocity (ft/sec) | $O_2$ Conc. (% Dry) |
|---|---|---|---|---|---|---|---|---|---|
| | | in. | ① ΔP | ② | | $T_S$ | $M_S$ | $V_S$ | |
| | FD | 1 | .69 | .52 | .51 | | | | |
| | | 5 | .56 | .39 | | | | | |
| | | 9 | .43 | .36 | .35 | | | | |
| | | 13 | .35 | .36 | | | | | |
| | | 17 | .22 | .36 | .34 | | | | |
| | | 21 | .29 | .39 | | | | | |
| | | 25 | .31 | .38 | .35 | | | | |
| | | 29 | .43 | .49 | | | | | |
| | | 31 | .44 | .46 | .47 | | | | |
| | | | #7 | #18 | | | | | |
| | SCA | .4 | .19 | .14 | | | | | |
| | | 1.5 | .16 | .17 | | | | | |
| | | 3.0 | .16 | .19 | | | | | |
| | | 7 | .16 | .17 | | | | | |
| | | 8.5 | .15 | .16 | | | | | |
| | | 9.1 | .11 | .14 | | | | | |

6002-13

## VELOCITY TRAVERSE

**Project:**

**Date:** 6/7/76

**Location:**

**Unit:**

**Test:** 204-16

**Fuel:**

**Test Description:**

**Personnel:**

**Barometric Press. (in. Hg):**

**Absolute Static Press. in Stack (in. Hg):** ($P_s$)

**Pitot Tube Coefficient:** ($C_p$)

$$V_s = 85.48\, C_p \left[\frac{T_s \Delta P}{P_s M_s}\right]^{1/2}$$

**Stack Cross Section**

| Time | Traverse Port | Point Depth | Velocity Head (in. $H_2O$) |  | Gas Temp. (°F) | Gas Temp. (°R) | Molecular Wt. | Velocity (ft/sec) | $O_2$ Conc. (% Dry) |
|---|---|---|---|---|---|---|---|---|---|
|  |  | in. | ① ΔP | ② |  | $T_S$ | $M_S$ | $V_S$ |  |
|  |  | 1 | .62 | .46 |  |  |  |  |  |
|  |  | 5 | .57 | .38 |  |  |  |  |  |
|  |  | 9 | .43 | .32 |  |  |  |  |  |
|  |  | 13 | .37 | .32 |  |  |  |  |  |
|  | FD | 17 | .29 | .31 |  |  |  |  |  |
|  |  | 21 | .30 | .30 |  |  |  |  |  |
|  |  | 25 | .22 | 33 |  |  |  |  |  |
|  |  | 29 | .26 | .38 |  |  |  |  |  |
|  |  | 31 | .32 | .36 |  |  |  |  |  |
|  |  |  | #7 | #8 |  |  |  |  |  |
|  |  | .4 | .14 |  |  |  |  |  |  |
|  |  | 1.5 | .16 |  |  |  |  |  |  |
|  | SCA | 3.0 | .18 |  |  |  |  |  |  |
|  |  | 7 | .17 |  |  |  |  |  |  |
|  |  | 8.5 | .16 |  |  |  |  |  |  |
|  |  | 9.1 | .13 |  |  |  |  |  |  |

6002-13

# VELOCITY TRAVERSE

Project:
Date: 6/7/76
Location:
Unit:
Test: 204-17
Fuel:

Test Description:

Personnel:

Barometric Press. (in. Hg):
Absolute Static Press. in Stack (in. Hg): ($P_s$)
Pitot Tube Coefficient: ($C_p$)

$$V_s = 85.48\, C_p \left[\frac{T_s \Delta P}{P_s M_s}\right]^{1/2}$$

Stack Cross Section

| Time | Traverse Port | Point Depth | Velocity Head (in. $H_2O$) | | Gas Temp. (°F) | Gas Temp. (°R) | Molecular Wt. | Velocity (ft/sec) | $O_2$ Conc. (% Dry) |
|---|---|---|---|---|---|---|---|---|---|
| | | in. | ① ΔP | ② | | $T_S$ | $M_S$ | $V_S$ | |
| | FD | 1 | .61 | .38 | | | | | |
| | | 5 | .37 | .30 | | | | | |
| | | 9 | .31 | .27 | | | | | |
| | | 13 | .30 | .26 | | | | | |
| | | 17 | .24 | .26 | | | | | |
| | | 21 | .26 | .32 | | | | | |
| | | 25 | .25 | .33 | | | | | |
| | | 29 | .23 | .27 | | | | | |
| | | 31 | .23 | .25 | | | | | |
| | | | #17 | | | | | | |
| | SCA | .4 | .13 | | | | | | |
| | | 1.5 | .16 | | | | | | |
| | | 3.0 | .15 | | | | | | |
| | | 7 | .18 | | | | | | |
| | | 8.5 | .17 | | | | | | |
| | | 9.1 | .13 | | | | | | |

6002-13

## VELOCITY TRAVERSE

Project: __________ Test Description: __________

Date: 6/8/76

Location: __________

Unit: __________

Test: 205-6 Personnel: __________

Fuel: __________

Barometric Press. (in. Hg): __________

Absolute Static Press. in Stack (in. Hg): __________ ($P_s$)

Pitot Tube Coefficient: __________ ($C_p$)

Stack Cross Section

$$V_s = 85.48\ C_p \left[\frac{T_s \Delta P}{P_s M_s}\right]^{1/2}$$

BYPASS DUCT
FULL OPEN

| Time | Traverse Point Port | Depth | Velocity Head (in. $H_2O$) | Gas Temp. (°F) | Gas Temp. (°R) | Molecular Wt. | Velocity (ft/sec) | $O_2$ Conc. (% Dry) |
|---|---|---|---|---|---|---|---|---|
| | | | $\Delta P$ | | $T_S$ | $M_S$ | $V_S$ | |
| | | 1 | 1.5 | | | | | |
| | | 3 | 1.6 | | | | | |
| | | 5 | 1.5 | | | | | |
| | | 7 | 1.2 | | | | | |
| | | 9 | 1.1 | | | | | |
| | | 11 | .92 | | | | | |
| | | 13 | .72 | | | | | |
| | | 15 | .65 | | | | | |
| | | 17 | .83 | | | | | |
| | | 18 | .90 | | | | | |
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6002-13

## VELOCITY TRAVERSE

**Project:**

**Date:** 6/8/76

**Location:**

**Unit:**

**Test:** 205-7

**Fuel:**

**Test Description:**

**Personnel:**

**Barometric Press. (in. Hg):**

**Absolute Static Press. in Stack (in. Hg):** ($P_s$)

**Pitot Tube Coefficient:** ($C_p$)

$$V_s = 85.48\, C_p \left[\frac{T_s \Delta P}{P_s M_s}\right]^{1/2}$$

$\frac{1}{2}$ BYPASS

Stack Cross Section

| Time | Traverse Port | Point Depth | Velocity Head (in. $H_2O$) | Gas Temp. (°F) | Gas Temp. (°R) | Molecular Wt. | Velocity (ft/sec) | $O_2$ Conc. (% Dry) |
|---|---|---|---|---|---|---|---|---|
| | | | $\Delta P$ | | $T_s$ | $M_s$ | $V_s$ | |
| | | 1 | 0 | | | | | |
| | | 3 | 0 | | | | | |
| | | 5 | 0 | | | | | |
| | | 7 | 0 | | | | | |
| | | 9 | .06 | | | | | |
| | | 11 | .3 | | | | | |
| | | 13 | .75 | | | | | |
| | | 15 | 1.3 | | | | | |
| | | 17 | 1.7 | | | | | |
| | | 19 | 1.8 | | | | | |
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6002-13

# VELOCITY TRAVERSE

Project:
Test Description:
Date: 6/8/76
Location:
Unit:
Test: 20514-8
Personnel:
Fuel:
Barometric Press. (in. Hg):
Absolute Static Press. in Stack (in. Hg): ($P_s$)
Pitot Tube Coefficient: ($C_p$)

$$V_s = 85.48\ C_p \left[\frac{T_s \Delta P}{P_s M_s}\right]^{1/2}$$

Stack Cross Section

| Time | Traverse Point Port | Traverse Point Depth | Velocity Head (in. $H_2O$) | Gas Temp. (°F) | Gas Temp. (°R) | Molecular Wt. | Velocity (ft/sec) | $O_2$ Conc. (% Dry) |
|---|---|---|---|---|---|---|---|---|
| | | | $\Delta P$ | | $T_s$ | $M_s$ | $V_s$ | |
| | | 1 | 0 | | | | | |
| | | 3 | 0 | | | | | |
| | | 5 | 0 | | | | | |
| | | 7 | 0 | | | | | |
| | | 9 | .04 | | | | | |
| | | 11 | .22 | | | | | |
| | | 13 | .53 | | | | | |
| | | 15 | 0.95 | | | | | |
| | | 17 | 1.2 | | | | | |
| | | 18 | 1.3 | | | | | |
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## VELOCITY TRAVERSE

**Project:**

**Date:** 6/9/76

**Location:**

**Unit:**

**Test:** 205/11-8

**Fuel:**

**Test Description:**

**Personnel:**

**Barometric Press. (in. Hg):**

**Absolute Static Press. in Stack (in. Hg):** ($P_s$)

**Pitot Tube Coefficient:** ($C_p$)

$$V_S = 85.48\, C_p \left[\frac{T_S \Delta P}{P_S M_S}\right]^{1/2}$$

Stack Cross Section

| Time | Traverse Port | Point Depth | Velocity Head (in. $H_2O$) | | Gas Temp. (°F) | Gas Temp. (°R) | Molecular Wt. | Velocity (ft/sec) | $O_2$ Conc. (% Dry) |
|---|---|---|---|---|---|---|---|---|---|
| | | | #17 ΔP | #18 | | $T_S$ | $M_S$ | $V_S$ | |
| | | .4 | .13 | .16 | | | | | |
| | | 1.5 | .16 | .21 | | | | | |
| | | 3 | .16 | .21 | | | | | |
| | | 7 | .16 | .18 | | | | | |
| | | 8.5 | .15 | .18 | | | | | |
| | | 9.1 | .11 | .16 | | | | | |
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6002-13

# VELOCITY TRAVERSE

**Project:** ____________ **Test Description:** ____

**Date:** 6-9-76

**Location:** ____________

**Unit:** ____________

**Test:** 2006-15 **Personnel:** ____________

**Fuel:** ____________

**Barometric Press. (in. Hg):** ____________

**Absolute Static Press. in Stack (in. Hg):** ____________ ($P_s$)

**Pitot Tube Coefficient:** ____________ ($C_p$)

$$V_s = 85.48\, C_p \left[\frac{T_s \Delta P}{P_s M_s}\right]^{1/2}$$

Stack Cross Section

| Time | Traverse Point | | Velocity Head (in. $H_2O$) | Gas Temp. (°F) | Gas Temp. (°R) | Molecular Wt. | Velocity (ft/sec) | $O_2$ Conc. (% Dry) |
|---|---|---|---|---|---|---|---|---|
| | Port | Depth | ① ΔP ② | | $T_S$ | $M_S$ | $V_S$ | |
| | | 1 | .85 .48 | | | | | |
| | | 5 | .70 .50 | | | | | |
| | | 9 | .53 .45 | | | | | |
| | | 13 | .43 .44 | | | | | |
| | | 17 | .30 .27 | | | | | |
| | | 21 | .59 .40 | | | | | |
| | | 25 | .63 .48 | | | | | |
| | | 29 | .75 .58 | | | | | |
| | | 32 | .77 .70 | | | | | |
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6002-13

## VELOCITY TRAVERSE

**Project:** ______

**Date:** 6/10/76

**Location:** ______

**Unit:** ______

**Test:** 204-21

**Fuel:** ______

**Test Description:** ______

**Personnel:** ______

**Barometric Press. (in. Hg):** ______

**Absolute Static Press. in Stack (in. Hg):** ______ ($P_s$)

**Pitot Tube Coefficient:** ______ ($C_p$)

$$V_s = 85.48\, C_p \left[\frac{T_s \Delta P}{P_s M_s}\right]^{1/2}$$

Stack Cross Section

| Time | Traverse Point Port | Depth | Velocity Head (in. $H_2O$) #17 ΔP | #18 | Gas Temp. (°F) | Gas Temp. (°R) $T_S$ | Molecular Wt. $M_S$ | Velocity (ft/sec) $V_S$ | $O_2$ Conc. (% Dry) |
|---|---|---|---|---|---|---|---|---|---|
| | | .4 | .19 | .20 | | | | | |
| | | 1.5 | .22 | .23 | | | | | |
| | | 3.0 | .23 | .25 | | | | | |
| | | 7.0 | .23 | .24 | | | | | |
| | | 8.5 | .23 | .22 | | | | | |
| | | 9.6 | .15 | .20 | | | | | |
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6002-13

## VELOCITY TRAVERSE

Project: ____________ Test Description: ___

Date: 6/10/76

Location: ____________

Unit: ____________

Test: 204-22 Personnel: ____________

Fuel: ____________

Barometric Press. (in. Hg): ____________

Absolute Static Press. in Stack (in. Hg): ____________ ($P_B$)

Pitot Tube Coefficient: ____________ ($C_p$)

$$V_S = 85.48\, C_p \left[\frac{T_S \Delta P}{P_S M_S}\right]^{1/2}$$

Stack Cross Section

| Time | Traverse Port | Point Depth | Velocity Head (in. $H_2O$) | | Gas Temp. (°F) | Gas Temp. (°R) | Molecular Wt. | Velocity (ft/sec) | $O_2$ Conc. (% Dry) |
|---|---|---|---|---|---|---|---|---|---|
| | | | #17 ΔP | #18 | | $T_S$ | $M_S$ | $V_S$ | |
| | | .4 | .18 | .21 | | | | | |
| | | 1.5 | .24 | .24 | | | | | |
| | | 3.0 | .25 | .26 | | | | | |
| | | 7.0 | .25 | .25 | | | | | |
| | | 8.5 | .24 | .24 | | | | | |
| | | 9.6 | .19 | .22 | | | | | |
| | | | ① | ② | | | | | |
| | FD | 1" | .61 | .47 | | | | | |
| | | 5 | .42 | .36 | | | | | |
| | | 9 | .36 | .31 | | | | | |
| | | 13 | .35 | .30 | | | | | |
| | | 17 | .22 | .32 | | | | | |
| | | 21 | .27 | .34 | | | | | |
| | | 25 | .30 | .37 | | | | | |
| | | 29 | .32 | .21 | | | | | |
| | | 33 | .33 | .38 | | | | | |

6002-13

## VELOCITY TRAVERSE

Project: ______ Test Description: ______

Date: 6/10/76

Location: ______

Unit: ______

Test: 204-25 Personnel: ______

Fuel: ______

Barometric Press. (in. Hg): ______

Absolute Static Press. in Stack (in. Hg): ______ ($P_s$)

Pitot Tube Coefficient: ______ ($C_p$)

$$V_S = 85.48\, C_P \left[\frac{T_S \Delta P}{P_S M_S}\right]^{1/2}$$

Stack Cross Section

| Time | Traverse Point Port | Traverse Point Depth | Velocity Head (in. $H_2O$) | Gas Temp. (°F) | Gas Temp. (°R) | Molecular Wt. | Velocity (ft/sec) | $O_2$ Conc. (% Dry) |
|---|---|---|---|---|---|---|---|---|
| | | | #17 ΔP #15 | | $T_S$ | $M_S$ | $V_S$ | |
| | | .4 | .34 .44 | | | | | |
| | | 1.5 | .47 .49 | | | | | |
| | | 3.0 | .51 .54 | | | | | |
| | | 7.0 | .50 .52 | | | | | |
| | | 8.5 | .45 .47 | | | | | |
| | | 9.6 | .34 .39 | | | | | |
| | | | | | | | | |
| | | 1" | .55 | | | | | |
| | | 3" | .61 | | | | | |
| | | 5 | .63 | | | | | |
| | | 7 | .59 | | | | | |
| | BYPASS DUCT | 9 | .67 | | | | | |
| | | 11 | .66 | | | | | |
| | | 13 | .59 | | | | | |
| | | 15 | .59 | | | | | |
| | | 17 | .70 | | | | | |
| | | 18 | .67 | | | | | |

6002-13

## VELOCITY TRAVERSE

Project:
Date: 6/10/76
Location:
Unit:
Test: 204/5-29
Fuel:

Test Description:

Personnel:

Barometric Press. (in. Hg):
Absolute Static Press. in Stack (in. Hg): 2.1 $(P_s)$
Pitot Tube Coefficient: $(C_p)$

$$V_S = 85.48\ C_p \left[\frac{T_S \Delta P}{P_S M_S}\right]^{1/2}$$

Stack Cross Section

| Time | Traverse Point Port | Depth | Velocity Head (in. $H_2O$) | Gas Temp. (°F) | Gas Temp. (°R) | Molecular Wt. | Velocity (ft/sec) | $O_2$ Conc. (% Dry) |
|---|---|---|---|---|---|---|---|---|
| | | | #17ΔP #18 | | $T_S$ | $M_S$ | $V_S$ | |
| | | | .39 .41 | 95° | | | | |
| | | | .47 .47 | | | | | |
| | | | .48 .48 | | | | | |
| | | | .48 .48 | | | | | |
| | | | .45 .44 | | | | | |
| | | | .33 .40 | | | | | |
| | | | | | | | | |
| | BYPASS DUCT | 1 | .56 | | | | | |
| | | 3 | .61 | | | | | |
| | | 5 | .60 | | | | | |
| | | 7 | .56 | | | | | |
| | | 9 | .61 | | | | | |
| | | 11 | .64 | | | | | |
| | | 13 | .65 | | | | | |
| | | 15 | .60 | | | | | |
| | | 17 | .66 | | | | | |
| | | 18 | .67 | | | | | |

6002-13

STAGED COMBUSTION AIR FLOW DATA

**KVB**

Test No. ____________

Test No. 203-26 Date 5/20/76 Test Type ____________

Boiler No. ______ Location No. 38 Capacity ______ $10^3$ lb/hr Burner Type ____________

Test Fuel No 6 Test Load ______ $10^3$ lb/hr

$P_\infty$ 29.720"

PITOT TRAVERSE @ 11.45 5/27

| Test No. | 203-26 | | DIST INTO DUCT | TEST 17 | POINT | TEST 18 | POINT | | | | 203 -28 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Windbox °F/iwg | | | .4" | .16 .15 | AVG. .155 | .18 .21 | .21 .20 | AVG .205 | | | | |
| $T_1/P_1$ | | | 1.5 | .16 .17 | .165 | .18 .23 | .24 .23 | .23 | | | | |
| $T_2/P_2$ | | | 3.0 | .18 .18 | .18 | .19 .24 | .23 .29 | .23 | | | | |
| $T_3/P_3$ | | | 7.0 | .18 .17 | .175 | .20 .23 | .24 .24 | .23 | | | | |
| $T_4/P_4$ | | | 8.5 | .16 .16 | .16 | .19 .23 | .21 .22 | .22 | | | | |
| Furnace °F/iwg | | | 9.1 | .13 .12 | .125 | .15 .17 | .13 .18 | .16 | | | | |
| | | AVGS. | | | .16 | | | .213 | | | | |
| SC Ports °F/iwg | | | | | | | | | | | | |
| $T_6/P_6$ | | | | | | | | | | | | |
| $T_7/P_7$ | | | | | | | | | | | | |
| $T_8/P_8$ | | | | | | | | | | | | |
| $T_9/P_9$ | | | | | | | | | | | | |
| $T_{10}/P_{10}$ | | | | | | | | | | | | |
| $T_{11}/P_{11}$ | | | | | | | | | | | | |
| $T_{12}/P_{12}$ | | | | | | | | | | | | |
| $T_{13}/P_{13}$ | | | | | | | | | | | | |
| $T_{14}/P_{14}$ iwg | 15 | | | | | | | | | | 15 | |
| $T_{15}/P_{15}$ | 14 | | | | | | | | | | 14 | |
| $T_{16}/P_{16}$ | 103 | | | | | | | | | | 100 | |
| $T_{17}/P_{17}$ | 102 | | | | | | | | | | | |
| $T_{18}/P_{18}$ | | | | | | | | | | | | |
| $T_{19}/P_{19}$ | | | | | | | | | | | | |
| $T_{20}/P_{20}$ | | | | | | | | | | | | |

4/76
60-32

STAGED COMBUSTION AIR FLOW DATA

**KVB**

Test No.________________

Test No. 203-27 Date 5/21/76 Test Type____________ ____________

Boiler No. _______ Location No. ________ Capacity ________ $10^3$ lb/hr Burner Type____________

Test Fuel No 6 Test Load__________ $10^3$ lb/hr

| Test No. | POINT<br>ΔP | #17 | | #13<br>ΔP | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Windbox °F/iwg .4" | .11 | .12 | .115 | .16 | .15 | .155 | | | | | | |
| $T_1/P_1$ 1.5 | .15 | .16 | .155 | .17 | .17 | .17 | | | | | | |
| $T_2/P_2$ 3 | .15 | .16 | .155 | .18 | .18 | .18 | | | | | | |
| $T_3/P_3$ 7 | .16 | .15 | .155 | .19 | .18 | .185 | | | | | | |
| $T_4/P_4$ 8.5 | .14 | .14 | .14 | .14 | .16 | .15 | | | | | | |
| Furnace °F/iwg 9.1 | .08 | .10 | .09 | .13 | .12 | .125 | | | | | | |
| AVG. | | | .135 | | | .161 | | | | | | |
| SC Ports °F/iwg | | | | | | | | | | | | |
| $T_6/P_6$ | | | | | | | | | | | | |
| $T_7/P_7$ $P_\infty$ = 29.60" | | | | | | | | | | | | |
| $T_8/P_8$ CONTROL RM. | | | | | | | | | | | | |
| $T_9/P_9$ T DRY 83 | | | | | | | | | | | | |
| $T_{10}/P_{10}$ WET 68 | | | | | | | | | | | | |
| $T_{11}/P_{11}$ R.H. 50 | | | | | | | | | | | | |
| $T_{12}/P_{12}$ | | | | | | | | | | | | |
| $T_{13}/P_{13}$ | | | | | | | | | | | | |
| $T_{14}/P_{14}$ | | | | | | | | | | | | |
| $T_{15}/P_{15}$ | | | | | | | | | | | | |
| $T_{16}/P_{16}$ | | | | | | | | | | | | |
| $T_{17}/P_{17}$ | | | | | | | | | | | | |
| $T_{18}/P_{18}$ | | | | | | | | | | | | |
| $T_{19}/P_{19}$ | | | | | | | | | | | | |
| $T_{20}/P_{20}$ | | | | | | | | | | | | |

4/76
60-32

STAGED COMBUSTION AIR FLOW DATA

**KVB**

Test No. 204-

Test No. 204-2 Date 6/3/76, 6/4 Test Type

Boiler No. Location No. Capacity 45 $10^3$ lb/hr Burner Type P UG

Test Fuel N. GAS Test Load 38 $10^3$ lb/hr

| Test No. | 204-1 | 204-2 | 204.3 | 204-4 | 204-5 | 204-6 | 204-7 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Windbox °F/iwg | | | | | | | | | | | | |
| $T_1/P_1$ | | | | | | | | | | | | |
| $T_2/P_2$ | | | | | | | | | | | | |
| $T_3/P_3$ | | | | | | | | | | | | |
| $T_4/P_4$ | | | | | | | | | | | | |
| Furnace °F/iwg | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| SC Ports °F/iwg | | | | | | | | | | | | |
| $T_6/P_6$ | | | | | 15.5 | | 15.5 | | | | | |
| $T_7/P_7$ | | | | | 100 15 | | 100 14.5 | | | | | |
| $T_8/P_8$ | | | | /15 | | | | | | | | |
| $T_9/P_9$ | | | | 100/15.5 | | | | | | | | |
| $T_{10}/P_{10}$ | | | /17 | | | | | | | | | |
| $T_{11}/P_{11}$ | | | 102/15 | | | | | | | | | |
| $T_{12}/P_{12}$ | | 92/15 | | | | | | | | | | |
| $T_{13}/P_{13}$ | | 15 | | | | | | | | | | |
| $T_{14}/P_{14}$ | | | | | | | | | | | | |
| $T_{15}/P_{15}$ | | | | | | | | | | | | |
| $T_{16}/P_{16}$ | | 96/21 | 104/21 | /21 | | | 102/21 | | | | | |
| $T_{17}/P_{17}$ | | | | | | | | | | | | |
| $T_{18}/P_{18}$ | | | | | | | | | | | | |
| $T_{19}/P_{19}$ | | | | | | | | | | | | |
| $T_{20}/P_{20}$ | | | | | | | | | | | | |

4/76
60-32

STAGED COMBUSTION AIR FLOW DATA

**KVB**

Test No.____________

Test No. 204-10 Date 6/7/76 Test Type SCA

Boiler No. ______ Location No. 58 Capacity 45 $10^3$ lb/hr Burner Type FIJG

Test Fuel N.G. Test Load ______ $10^3$ lb/hr

| Test No. | | 204-10 | 204-11 | 204-12 | 204-13 | 204-14 | 204-15 | -16 | -17 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Windbox °F/iwg | | | | | | | | | | | | |
| $T_1/P_1$ | | | | | | | | | | | | |
| $T_2/P_2$ | | | | | | | | | | | | |
| $T_3/P_3$ | | | | | | | | | | | | |
| $T_4/P_4$ | | | | | | | | | | | | |
| Furnace °F/iwg | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| SC Ports °F/iwg | | | | | | | | | | | | |
| $T_6/P_6$ | | | | | 9.0 | 7.5 | 15.5 | 15.5 | 15.2 | | | |
| $T_7/P_7$ | | | | 15.0 | 8.9 | 7.0 | 15.0 | 15.0 | 14.9 | | | |
| $T_8/P_8$ | | | 15.0 | | | | | | | | | |
| $T_9/P_9$ | | | 15.0 | | | | | | | | | |
| $T_{10}/P_{10}$ | | | | | | | | | | | | |
| $T_{11}/P_{11}$ | | | | | | | | | | | | |
| $T_{12}/P_{12}$ | | | | | | | | | | | | |
| $T_{13}/P_{13}$ | | | | | | | | | | | | |
| $T_{14}/P_{14}$ | | 15.5 | | | | | | | | | | |
| $T_{15}/P_{15}$ | | 13.5 | | | | | | | | | | |
| $T_{16}/P_{16}$ °F/iwg | | 102/21 | 106 | | 108 | 110 | 109 | 109 | 109 | | | |
| $T_{17}/P_{17}$ | | | 20.8 | | 12.2 | 10.0 | 20.5 | 20.7 | 20.5 | | | |
| $T_{18}/P_{18}$ | | | | | | | | | | | | |
| $T_{19}/P_{19}$ | | | | | | | | | | | | |
| $T_{20}/P_{20}$ | | | | | | | | | | | | |

4/76
60-32

STAGED COMBUSTION AIR FLOW DATA

**KVB**

Test No.__________

Test No. 204 8-26 Date 6/9-6/10/76 Test Type__________

Boiler No. ______ Location No. 38 Capacity ______ $10^3$ lb/hr Burner Type C/G

Test Fuel NAT. GAS Test Load ≈40 $10^3$ lb/hr

|  |  |  |  |  |  |  | 6/10 |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test No. | 204/4-9 |  | 204-18 | 204-19 | 204-20 |  | 204-21 | 204-22 | -23 | -24 | -25 | -26 |
| Windbox °F/iwg |  |  |  |  |  |  |  |  |  |  |  |  |
| $T_1/P_1$ |  |  |  |  |  |  |  |  |  |  |  |  |
| $T_2/P_2$ |  |  |  |  |  |  |  |  |  |  |  |  |
| $T_3/P_3$ |  |  |  |  |  |  |  |  |  |  |  |  |
| $T_4/P_4$ |  |  |  |  |  |  |  |  |  |  |  |  |
| Furnace °F/iwg |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| SC Ports °F/iwg |  |  |  |  |  |  |  |  |  |  |  |  |
| $T_6/P_6$ | 15.5 |  |  |  |  |  |  |  |  |  |  |  |
| $T_7/P_7$ | 14.9 |  |  |  |  |  |  |  |  |  |  |  |
| $T_8/P_8$ |  |  |  |  |  |  |  |  |  |  |  |  |
| $T_9/P_9$ |  |  |  |  |  |  |  |  |  |  |  |  |
| $T_{10}/P_{10}$ |  |  |  |  |  |  |  |  |  |  |  |  |
| $T_{11}/P_{11}$ |  |  |  |  |  |  |  |  |  |  |  |  |
| $T_{12}/P_{12}$ |  |  |  |  |  |  | 0.1 | 14.0 |  | 0 | 1.5 | 11.0 |
| $T_{13}/P_{13}$ |  |  |  |  |  |  | 0.1 | 14.0 |  | -0.1 | 1.5 | 11.0 |
| $T_{14}/P_{14}$ |  |  | 15.2 | 15.5 | 15.4 |  | 15.0 | 0 |  | 15.0 | 14.0 | 12.0 |
| $T_{15}/P_{15}$ |  |  | 13.2 | 13.2 | 13.2 |  | 12.8 | 0 |  | 13.0 | 12.3 | 10.0 |
| $T_{16}/P_{16}$ | 114/20.5 |  | 112/ | 114/ | 114/ |  | 110/ | 110 |  | 117 | 118 | 116 |
| $T_{17}/P_{17}$ |  |  |  |  |  |  |  | 19.8 |  |  |  |  |
| $T_{18}/P_{18}$ | 20.5 |  | /20.4 | 20.4 | 20.4 |  | 19.9 | 19.8 |  | 20 | 19 | 16 |
| $T_{19}/P_{19}$ |  |  |  |  |  |  |  |  |  |  |  |  |
| $T_{20}/P_{20}$ |  |  |  |  |  |  |  |  |  |  |  |  |

4/76
60-32

STAGED COMBUSTION AIR FLOW DATA

**KVB**

Test No. ____________

Test No. ____________ Date 6/10/76 Test Type ____________

Boiler No. ______ Location No. 38 Capacity ______ $10^3$ lb/hr Burner Type RING

Test Fuel NAT. GAS Test Load ≈40 $10^3$ lb/hr

6/10

| Test No. | 204/5 -27 | 204/5 -28 | -29 | -30 | -31 | -32 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Windbox °F/iwg | | | | | | | | | | | | |
| $T_1/P_1$ | | | | | | | | | | | | |
| $T_2/P_2$ | | | | | | | | | | | | |
| $T_3/P_3$ | | | | | | | | | | | | |
| $T_4/P_4$ | | | | | | | | | | | | |
| Furnace °F/iwg | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| SC Ports °F/iwg | | | | | | | | | | | | |
| $T_6/P_6$ OPEN 1/ | $\frac{1}{3}$ 1 | | 11.5 | | 13 | | | | | | | |
| $T_7/P_7$ " | $\frac{1}{3}$ 2 | | 10.8 | ~~12~~ | 12 | | | | | | | |
| $T_8/P_8$ | | | | | | | | | | | | |
| $T_9/P_9$ | | | | | | | | | | | | |
| $T_{10}/P_{10}$ | | | | | | | | | | | | |
| $T_{11}/P_{11}$ | | | | | | | | | | | | |
| $T_{12}/P_{12}$ 1/2 | 5 | | | | | | | | | | | |
| $T_{13}/P_{13}$ 1/2 OPEN | 3 | | | | | | | | | | | |
| $T_{14}/P_{14}$ FULL | 12 | 12.5 | 11.5 | | 4 | | | | | | | |
| $T_{15}/P_{15}$ FULL OPEN | 10 | 10.5 | 9.8 | | 3.5 | | | | | | | |
| $T_{16}/P_{16}$ | 115 | 112 | 111 | | 110 | 110 | | | | | | |
| $T_{17}/P_{17}$ | | | | | | | | | | | | |
| $T_{18}/P_{18}$ | | 16.0 | 15.0 | | 17 | 19 | | | | | | |
| $T_{19}/P_{19}$ | | | | | | | | | | | | |
| $T_{20}/P_{20}$ | | | | | | | | | | | | |

4/76
60-32